Appendix C.4 Comment Database

Part I - Comments

[00:14:00] Councilmember Annette Bryan?

Annette: **[Speaking native American]**, good day. My name is Annette Bryan, and I'm here from the Puyallup Tribal Council with Vice Chairman David Bean and Councilwoman Anna Bean and Tribal Member Dakota Case. We are here on behalf of the Puyallup Tribal Council and the Puyallup Tribal membership. The city of Tacoma and Puget Sound Clean Air Agency have failed to consult with the Puyallup Tribe. They have allowed PSE to construct the liquified natural gas plant without the proper permits.

Consultation with the Puyallup Tribe means you don't build, unless you consult and come to an agreement with the tribe. Consultation is required by federal law to properly carry out the federal trust responsibility intended to secure our treaty protected land and resources. Thus the failure to properly consult with the tribe is a violation of federal law. It's important here because the authority was delegated to your agency. The federal trust responsibility that goes with that delegation is a part of that.

[00:15:00] These offenses are compounded by the fact we're now reviewing a draft SEIS that completely fails to examine the true impacts on our tribal numbers, members, homelands, treaty protected land and water, and all of the surrounding communities thereby putting not only our people and environment at great risk but the surrounding communities as well. Moreover, the scope of this project has changed, and the study fails to address that change. PSE does not answer to a constituency. PSE is a foreign company made up of a foreign group of investors trampling on our homelands, our community, and our rights with money leveraged from taxpayers.

The Port of Tacoma cannot responsibly subsidize a corporate venture with taxpayer dollars that ultimately harms those same taxpayers. This current science on LNG is not reflected in the study. We understand that many elected officials were misled into believing LNG is a transitional fuel and a cleaner for the environment.

[00:16:00] But we all know better now. Rejecting this study and this project is more likely to preserve our environment and keep our families safe. You talk about jobs. The Puyallup Tribe of Indian employs over 3,200 jobs, full time employment, plus hundreds and hundreds of economic development jobs. Economy is the protecting jobs, and we can do more than 18 that this facility originally talked about. How you fuel the ships does not affect how

1106-1 5. Regulatory Framework
1106-2 5. Regulatory Framework
1106-3 5. Regulatory Framework
1106-4 3. Outside of SEIS Scope

many jobs there are. This is why the region's most respected environmental champions have chosen to stand against this project and this study and, instead, stand with the Puyallup Nation.

The Puget Sound Clean Air Study is nothing more than a false promise to the Puyallup Tribe of Indians and the citizens of Tacoma. It must be rejected and, at a minimum, redone. The tribe will be submitting formal written comments and respond to the SEIS, in addition to today's remarks.

[00:17:00] We also have a letter that we are working on getting signed by our chairman requesting a government to government consultation. Thank you.

0824-1 5. Regulatory Framework

Puyallup Tribe of Indians

November 1, 2018

RECEIVED
NOV 9 2018
Puget Sound
Clean Air Agency

VIA U.S. MAIL AND ELECTRONIC MAIL

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG project
1904 Third Avenue, Suite 105
Seattle, WA 98101

Re: Request for Government to Government Consultation

The Puyallup Tribe of Indians hereby requests consultation between the Puget Sound Clean Air Agency and the Tribe prior to the publication of the Final Supplemental Environmental Impact Statement for the above referenced project. This request is in addition to any other comments provided by the Tribe's representatives at the Public Hearing and in addition to written comments that will be provided by November 21, 2018.

While the Tribe appreciates the Puget Sound Clean Air Agency's ("the Agency") work on the draft SEIS, the Tribe has significant concerns with the analysis in the draft. The project identified in the Draft SEIS is very different that the project presented to and analyzed by the City of Tacoma in its final EIS. In addition to the concerns with the draft SEIS, the Tribe remains gravely concerned that the applicants are continuing to construct this facility without the necessary Notice of Construction permit in violation of Washington's Clean Air Act and the Agency's Notice of Violation.

The Draft SEIS demonstrates that this project will have wide range impacts on the environment and Tribal Resources. The Agency is acting through delegated authority that is traced not only to the State of Washington but also to the Federal Clean Air Act and the United States Environmental Protection Agency. Under the Federal Clean Air Act the EPA has a trust responsibility to the Tribe and must consult on matters that impact the Tribe. The State of Washington has parallel authorities to consult with the Tribe. The obligations of both the Federal Government and the State of Washington to consult with the Tribe do not vanish into thin air with delegation to the Agency. Therefore, the Tribe requests that formal government to government consultation, with the full quorum of Tribal Council as required, be scheduled without further delay.

Please contact our legal counsel, Lisa A. Anderson at (253) 573-7852, to schedule the government to government consultation. The Tribe reserves its rights to present additional comments throughout the comment period.

Sincerely,

Bill Sterud

Bill Sterud, Chairman
Puyallup Tribal Council

3009 E. Portland Avenue • Tacoma, Washington 98404 • 253/573-7800

From: Lisa Anderson
To: Public Comment
Cc: Lisa Anderson; "Nicholas G. Thomas"
Subject: Comments on the Draft SEIS for the Proposed Tacoma Liquefied Natural Gas Plant
Date: Wednesday, November 21, 2018 9:54:21 AM
Attachments: SKMBT_C654e18112013060.pdf

Attached, please find the Puyallup Tribes' comments on the above referenced SEIS, which were also sent via FedEx and U.S. Mail. Please provide confirmation of receipt of these comments.

Sincerely,

Lisa AH Anderson
Environmental Attorney
Puyallup Tribe of Indians
(253) 320-8285

Puyallup Tribe of Indians

November 16, 2018

VIA U.S. MAIL AND ELECTRONIC MAIL

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG project
1904 Third Avenue, Suite 105
Seattle, WA 98101

Re: Proposed Tacoma Liquefied Natural Gas Plant
Comments on Draft Supplemental Environmental Impact Statement

The Puyallup Tribe of Indians hereby submits the attached comments to the Draft Supplemental Environmental Impact Statement that was released for public comment on October 8, 2018. The attached comments are addition to any other comments provided by the Tribe's representatives at the Public Hearing and in addition to other materials provided to the agency in January of 2018, and again in June of 2018.

The Puyallup Tribe is a federally recognized Indian Tribe with its reservation located in Tacoma and surrounding communities in the State of Washington. The Tacoma LNG Plant and its associated pipelines are proposed to be constructed within and adjacent to the 1873 Survey Boundary for the Puyallup Tribe's Reservation. In addition to other lands, the Tribe owns land directly across the waterway from the proposed Tacoma LNG Plant site. The lands owned by the Tribe directly across the waterway are used as restoration sites providing critical and essential fish habitat, as cultural sites, and as marinas for both recreational and commercial boat traffic.

The Tribe, through the Medicine Creek Treaty of 1854, has a treaty right to fish in the waters surrounding the LNG Plant site and waters that will be impacted by the development and use at the proposed project site. The impacts to the waters, shorelines, habitat, and surrounding shoreline properties and uses go to the heart of the Tribe's culture and livelihood with potential impacts to fish, other wildlife, and natural resources, as well as impacts to the health and welfare of Tribal members. As is secured in Article VI, cl. 2 of the U.S. Constitution, the Treaty "shall be the supreme Law of the Land." As affirmed by *U.S. v. Washington,* the rights arising from the Medicine Creek Treaty cannot be diminished or interfered with absent authority from Congress.

While the Tribe appreciates the Puget Sound Clean Air Agency's ("the Agency") work on the DSEIS, the Tribe has significant concerns with the analysis in the draft. The project identified in the DSEIS is very different than the project presented to, and analyzed by, the City of Tacoma in its final EIS. Elements of the project relied upon for the DSEIS conclusions, such as bunkering out of the Blair Waterway, have not had any environmental review by the lead agency, the City of Tacoma, and were not considered by the City in its Shorelines Substantial Development Permit or by the Army Corps of Engineers in its NEPA review, Section 404 Permit, or the Corps issued Section 10 Permit under the Rivers and Harbors Act.

The DSEIS also contains several assumptions, in reaching its conclusion, that are either invalid or lack any reasonable support. The DSEIS fails to contain best available science in its analysis, rendering its conclusions

0865-1 5. Regulatory Framework

invalid. The DSEIS also is incomplete, with key data missing, which renders meaningful review by the public impossible.

In addition to the concerns with the DSEIS, the Tribe remains gravely concerned that the applicants are continuing to construct this facility without the necessary Notice of Construction permit in violation of Washington's Clean Air Act and the Agency's Notice of Violation. The Agency must, as it continues to review the impacts of this project, insist on the applicant's compliance and issue an order to force the applicants to cease the premature and illegal construction activity.

Finally, as the Tribe has previously notified the Agency, the Agency has failed to formally consult, on a government to government basis, with the Tribe. The DSEIS demonstrates that this project will have wide range impacts on the environment and Tribal Resources. The Agency is acting through delegated authority that is traced not only to the State of Washington but also to the Federal Clean Air Act and the United States Environmental Protection Agency. Under the Federal Clean Air Act the EPA has a trust responsibility to the Tribe and must consult on matters that impact the Tribe. The State of Washington has parallel authorities to consult with the Tribe. The obligations of both the Federal Government and the State of Washington to consult with the Tribe do not vanish as a result of delegation to the Agency. Furthermore, the Tribe is a neighboring jurisdiction with authority, under the Clean Air Act, to regulate air quality. Therefore, the Tribe requests that formal government to government consultation, with the full quorum of Tribal Council as required, be scheduled without further delay. The Tribe is prepared to have its consulting expert, Dr. Ranajit Sahu (PH.D, QEP, CEM), available for the government to government consultation.

Please contact our legal counsel, Lisa A. Anderson at (253) 573-7852, to schedule the government to government consultation. The Tribe reserves its rights to present additional comments throughout the review process.

Sincerely,

Bill Sterud

Bill Sterud, Chairman
Puyallup Tribal Council

cc: Governor Jay Inslee
Colonel Mark Geraldi, Seattle District Commander, U.S. Army Corps of Engineers
Mayor Victoria Woodards, City of Tacoma

PUYALLUP TRIBE OF INDIANS

Comments on the Draft Supplemental Environmental Impact Statement

For the

Proposed Liquefied Natural Gas Project

Issued for Public Comment October 8, 2018

I. INTRODUCTION

The Puyallup Tribe of Indians ("Tribe") is a federally recognized Indian Tribe with its Reservation located in the State of Washington and includes Tacoma and surrounding communities. The Tacoma LNG Plant and its associated pipelines are proposed to be constructed within and adjacent to the 1873 Survey Boundary for the Puyallup Tribe's Reservation. In addition to other lands, the Tribe owns land directly across the waterway from the proposed Tacoma LNG Plant site. The lands owned by the Tribe directly across the waterway are used as restoration sites providing critical and essential fish habitat, as cultural sites, and as marinas for both recreational and commercial boat traffic.

The Tribe, through the Medicine Creek Treaty of 1854, has a treaty right to fish in the waters surrounding the LNG Plant site – waters that will be impacted by the development and use at the proposed project site. Impacts to the waters, shorelines, habitat, and surrounding shoreline properties and uses go to the heart of the Tribe's culture and livelihood, and carry potential impacts to fish, other wildlife and natural resources. Such impacts also pose very real threats to the health and welfare of Tribal members. As is secured in Article VI, cl. 2 of the U.S. Constitution, the Treaty "shall be the supreme Law of the Land." As affirmed by *U.S. v. Washington,* the rights arising from the Medicine Creek Treaty cannot be diminished or interfered with absent authority from Congress.

The Tribe submits the comments set out in this document to the Draft Supplemental Environmental Impact Statement ("DSEIS") pertaining to the proposed Tacoma Liquefied Natural Gas facility (the "Project").[1] From reviewing the DSEIS, it is clear that the document presents a simplistic, unrealistic, and biased analytical framework designed to reach a pre-determined outcome – namely, that the proposed LNG facility will result in a net reduction of greenhouse gas ("GHG") emissions. While any analysis of the future (in this case 40 years out) must rely on assumptions to some extent, the DSEIS is completely dependent on a foundation of factually and technically unsupported and/or unrealistic and self-serving assumptions. So much so, that its conclusions are neither reasonable nor accurate. As detailed herein, it is the Tribe's position, as

[1] PSCAA's Notice of Construction Application Number for the Project is: 11386.

set out in the Resolution of the Tribal Council attached as Appendix A, that the DSEIS is invalid and must be revised to address fundamental deficiencies that prevent the DSEIS from presenting the "reasonably thorough discussion" of environmental impacts related to the Project's GHG emissions that SEPA requires. *Residents Opposed to Kittitas Turbines v. State Energy Facility Site Evaluation Council,* 165 Wn.2d 275, 312, 197 P.3d 1153 (2008).

Revising the DSEIS to correct its fatal flaws will require the Puget Sound Clean Air Agency ("PSCAA")[2] to fully vet and re-evaluate the DSEIS' conclusion. It is evident that this Project has the potential to cause significant adverse (though as of yet unanalyzed) impacts to the environment. The DSEIS fails to adequately account for these impacts, rendering it entirely inadequate. *See Columbia Riverkeeper et al. v. Cowlitz County et al.*, SHB No. 17-010c at *18 (Sept. 15, 2018) ("[B]ecause it failed to fully analyze the impacts of greenhouse gas emissions from the Project and to consider whether additional mitigation is required, the Final EIS is remanded to Cowlitz County and the Port for further SEPA analysis consistent with this opinion."). PSCAA should use and apply SEPA's substantive authority as well as other PSCAA authority to properly evaluate the Project's validity.

The remainder of the Tribe's comments are organized as follows: Section II provides an overview of SEPA and its application to the Supplemental Environmental Impact Statement required by PSCAA; Section III provides the Tribe's general comments concerning the DSEIS; Section IV provides the Tribe's technical comments concerning the DSEIS; and Section V provides the Tribe's concluding remarks concerning the DSEIS and this SEPA review more generally. Portions of Section IV were developed in consultation with Dr. Ranajit Sahu (PH.D, QEP, CEM). Dr. Sahu – who has approximately thirty years of experience in the fields of environmental – mechanical and chemical engineering, is a consulting expert who assisted the Tribe in its review of the DSEIS. A copy of Dr. Sahu's *curriculum vitae* is attached **Appendix B**. The Tribe will make Dr. Sahu available to discuss the points raised in Section IV of these comments as part of the formal consultation process.

II. SEPA COMPLIANCE

The State Environmental Policy Act ("SEPA") is the State of Washington's core environmental policy and review statute. Like its federal counterpart, the National Environmental Policy Act ("NEPA"), SEPA broadly serves two important purposes: (1) to ensure that government decision-makers are fully apprised of the environmental consequences of their proposed actions; and (2) to encourage public participation in the consideration of environmental impacts. *See Norway Hill Preservation and Prot. Ass'n v. King Co.*, 87 Wn.2d 267, 279, 552 P.2d 674 (1976).

In adopting SEPA, the Washington legislature declared the protection of the environment to be a core state priority. *See* RCW 43.21C.010. SEPA declares that "[t]he legislature recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment." RCW 43.21C.020(3). This policy statement "indicates in the strongest possible terms the basic

[2] And the City of Tacoma.

importance of environmental concerns to the people of the state." *Leschi v. Highway Comm'n*, 84 Wn.2d 271, 279-80 (1974).

SEPA is more than a purely "procedural" statute that encourages informed and politically accountable decision-making. Rather, in enacting SEPA, the Washington legislature gave decision-makers the affirmative authority to deny projects where environmental impacts are significant, cannot be mitigated, and/or violate local rules or policies. Indeed, SEPA provides substantive authority to condition or even deny proposed actions based on their environmental impacts, even where they meet all other requirements of the law. RCW 43.21C.060; *see also Columbia Riverkeeper et al. v. Cowlitz County et al.*, SHB No. 17-010c at *17 (Sept. 15, 2018) (acknowledging authority to impose conditions or deny a project based on greenhouse gas emissions).[3]

III. GENERAL COMMENTS

1. The Tacoma LNG Project will disproportionately expose the Puyallup Tribe to hazards, including the impacts of climate change.

The health impacts occasioned by climate change are numerous and increasing. In recent years, world leaders, medical, public health, and scientific bodies have expressed deep concerns about climate change as a threat to human health and well-being. Physicians for Social Responsibility,[4] the American Public Health Association,[5] and the Union of Concerned scientists (to name a few) have expressed the urgency for attention to the health threats of climate change and are speaking out about these threats with increasing urgency.

Likewise, the recently-released National Climate and Health Assessment describes how human health is already being affected by climate change: "Climate change is a significant threat to the health of the American people. The impacts of human-induced climate change are increasing nationwide. Rising greenhouse gas concentrations result in increases in temperature, changes in precipitation, increases in the frequency and intensity of some extreme weather events, and rising sea levels. These climate change impacts endanger our health by affecting our food and water sources, the air we breathe, the weather we experience, and our interactions with the built and

[3] As one SEPA treatise points out, when this premise was challenged by project proponents shortly after SEPA's enactment, "the courts consistently and emphatically responded that even if the action previously had been ministerial, it became ***environmentally discretionary*** with the enactment of SEPA." Richard Settle, SEPA: A Legal and Policy Analysis, § 18.01[2] (2014) (emphasis added). Decision-makers have also denied permits under this authority in a number of contexts, including those similar to the instant Project. *See, e.g., W. Main Associates v. City of Bellevue*, 49 Wn. App. 513, 521-23, 742 P.2d 1266 (1987) (upholding denial of permits based on historic and cultural impacts, view impacts, shadow impacts, traffic impacts, and air impacts); *State v. Lake Lawrence Pub. Lands Prot. Ass'n*, 92 Wn.2d 656, 659, 601 P.2d 494 (1979) (upholding denial of development of 14-acre parcel because of effects on bald eagles).

[4] Washington and Oregon Physicians for Social Responsibility, *Position Statement on Crude Oil Transport and Storage to Governors of Washington & Oregon* (2015).

[5] American Public Health Association, Policy on Climate and Health (2015) (online at: http:www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2015/12/03/15/34/public-health-opportunities-to-address-the-health-effects-of-climate-change).

0865-4 1. Determination of SEIS Scope - Comparison to FEIS
0865-5 11. LCA Inputs and Assumptions - General

natural environments. As the climate continues to change, the risks to human health continue to grow. Every American is vulnerable to the health impacts associated with climate change."[6]

The Puyallup Tribe and its members are entitled to the quiet enjoyment of their homeland as provided for by the Treaty of Medicine Creek and as confirmed by the Puyallup Tribe of Indians Settlement Act of 1989. Puyallup Tribe of Indians Settlement Act of 1989, Pub. L. 101-41, 103 Stat. 83 (June 21, 1989). These rights and entitlement would be threatened and violated by the proposed Project. The Tribe will be disproportionately impacted by the Project's emissions of air pollution (including toxic air pollutants) due to the fact that the Tribe's entire homeland shares an airshed with the proposed LNG facility, which will emit harmful pollutants in significant amounts.

Further, because the Tribe's entire homeland is located near and, in places, adjacent to the coast (where sea levels are rising and extreme weather events are becoming more frequent because of climate change), the Tribe is uniquely sensitive to and disproportionately impacted by the consequences of climate change. Thus, the Tribe will be disproportionately affected if the Project results in a net increase in GHG emissions to the earth's atmosphere.

2. The reported GHG emissions in the FEIS differ markedly from those reported in the DSEIS.

The DSEIS states, "that the direct onsite GHG emissions for the LNG plant are now estimated to be between 52,272 and 108,998 metric tons of CO_2e per year." [DSEIS, p. 4-13]. The Tribe notes with concern (and Ecology and Environment, Inc. ("E&E") itself acknowledges) that the FEIS forecasted the facility's greenhouse gas emissions to be 20,751 metric tons CO_2e per year. [DSEIS, p. 4-12]. In other words, PSCAA's consultant, E&E, itself states that the FEIS it authored underestimates the facility's direct onsite GHG emissions by a factor of approximately 2.5 to 5.

That E&E's analysis in the FEIS was so off-the-mark calls into question whether E&E is capable of performing an analysis upon which PSCAA can justifiably rely in making its permitting decision. To have assurance in E&E's work, a satisfactory explanation as to why the FEIS so profoundly underestimated the Project's greenhouse gas emissions is necessary and appropriate.

3. The DSEIS should analyze and possibly recommend BACT for GHGs as a permit condition.

The DSEIS does not suggest or analyze the use of Best Available Control Technology ("BACT") for GHG emissions. The reason for this omission appears to be the notion that the facility is not otherwise subject to Prevention of Significant Deterioration ("PSD") review and/or requirements. Accordingly, although BACT could be utilized to reduce the Project's GHG emissions, its use is neither analyzed nor recommended as a means of addressing the significant GHG concerns the Project triggers (potentially over 100,000 tonnes per year by the DSEIS' estimation).

[6] U.S. Global Climate Change Research Program, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (2016) (online at: https://health2016.globalchange.gov).

The technical comments in Section IV below identify a number of crucial flaws in the DSEIS and its analysis. Performing a flawed analysis appears to be the only way the DSEIS is able to conclude that the Project does not result in a net increase in GHG emissions. Additionally, there are very real concerns regarding the legitimacy and enforceability of the DSEIS' recommendation that all natural gas "supplied to the facility" come from British Columbia, Canada. [DSEIS, p. 4-13]. Because, under an appropriate analysis, there is a high likelihood that the Project will result in a substantial net increase of GHGs emitted into the atmosphere, BACT for GHGs should be considered and/or recommended as an additional permit condition.

4. To date, PSCAA has not formally consulted with the Tribe concerning this Project.

The Tribe appreciates the efforts of PSCAA to meet with Tribal Council to discuss its permitting authorities prior to PSCAA's decision to require a SEIS. However, as was discussed in that meeting, the Tribe strongly disagrees with PSCAA's position that it is not required to, and lacks authority to, participate in government-to-government consultation with the Tribe. PSCAA, which has delegated authority to implement the Clean Air Act and Washington's Clean Air Act, not only has the authority to consult with the Tribe and avoid destruction of the Tribe's well-established treaty rights held under the Medicine Creek Treaty, but also the obligation to do so.

Furthermore, PSCAA holds a responsibility to make an informed decision under SEPA. The Tribe exclusively holds information relevant to the analysis that PSCAA must perform to determine environmental impacts to the Tribe's members, who are among the most disproportionately impacted by the proposed Project, and to the Tribe's treaty-protected resources. Failure to consult with the Tribe cripples PSCAA's ability to perform a fully-informed analysis as required by law.

IV. TECHNICAL COMMENTS

According to the Intergovernmental Panel on Climate Change's (IPCC) October 8, 2018 report, the world needs to curb its carbon emissions by at least 45% of 2010 levels by 2030 and then achieve carbon neutrality by 2050, in order to avoid the worst effects of climate change. The report warns there is only a dozen years for global warming to be kept to a maximum of 1.5°C above historical baseline, beyond which even half a degree will significantly worsen the risks of drought, floods, extreme heat and poverty for hundreds of millions of people. Avoiding the most serious damage requires transforming the world economy away from fossil fuels within just a few years, said the authors.[7]

Therefore, from a climate change perspective, the next few years are likely the most important in human history. As such, the DSEIS' analysis needs to be correct and reliable. Unfortunately, the DSEIS' greenhouse gas analysis is fundamentally flawed and inaccurate.

Comparing two scenarios (dubbed Scenarios A and B) against a No Action Alternative, the DSEIS finds a net reduction in annual GHG emissions for Scenario A (a reduction of 39,897 tonnes

[7] The report further indicates that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels, and diminishing Arctic sea ice.

per year) and Scenario B (a reduction of 56,705 tonnes per year). *See* DSEIS Table 4-5. The findings for both Scenarios A and B are not truly supported and, thus, neither is valid nor credible.

Based on the values shown in Table 4-5 of the DSEIS, the reported Scenario A benefit is 5.48% of the No Action Alternative's annual GHG emissions, and the reported Scenario B benefit is 3.93%. Both scenarios are based on hundreds of assumptions (see, for example, the various worksheets in the workpapers provided for each scenario). Accordingly, the DSEIS' conclusion that the Project will always provide a GHG reduction under either scenario (and is, therefore, beneficial from a GHG reduction standpoint) is highly specious. If certain assumptions made by the DSEIS turn out to be incorrect for both the No Action Alternative and the Project Alternative, then estimated GHG reductions (*i.e.*, benefits) in the DSEIS reverse and become GHG increases when erroneous assumptions are corrected.

Of course, in making projections into the future, certain assumptions may be warranted or even necessary. As a general proposition, the making of assumptions is not the issue. Rather, the issue here is that many of the assumptions made in the DSEIS are problematic because they are not plausible, not reasonable, not supported, and/or simply not valid. Perhaps most importantly, the problematic assumptions the DSEIS makes are biased in favor of the Project in that they skew towards exaggerating the Project's benefits and minimizing (or ignoring) the GHG harms the Project presents.

The analysis presented in the DSEIS is also problematic because it does not furnish needed bases for the key assumptions it makes,[8] and because it does not conduct reasonable sensitivity analyses in the event its assumptions are incorrect. Simply put, the analysis presented in the DSEIS reduces the inherent uncertainties in future outcomes (multiple decades into the future) to just four story-lines: two no-project story lines and two corresponding project scenario story-lines. The DSEIS then proceeds to provide simplistic and self-serving comparisons between the respective no-project and project outcomes to ultimately find the small benefits that the DSEIS presents in Table 4-5 [DSEIS, p. 4-12] discusses.[9] This simplistic analysis lacks sufficient basis and is neither informative nor reliable.

Crucially, it appears that making equally-plausible alternate assumptions and/or simply correcting the problems in the DSEIS reveals **that the Project's impact would be a net increase**

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[8] One notable exception is that according to the DSEIS, the Project will result in a net increase of GHG released to the atmosphere if the natural gas is not sourced from British Columbia, Canada. As discussed below, the notion that sourcing natural gas from British Columbia will sufficiently reduce the Project's GHG impacts is questionable for multiple reasons, including very real questions concerning the legal and practical enforceability of the "sole source" requirement the DSEIS proposes.

[9] As a basic measure of the DSEIS analysis' simplistic and implausible nature, it is important to note the precision of the greenhouse gas emissions estimates in the no-project and project alternatives: 727,536 tonnes/year for the no-project in Scenario A; 687,639 tonnes/year for the project in Scenario A, etc. *See* DSEIS Table 4-5. Given the uncertainties in any one variable or assumption that underlies these estimates, not to mention all of them, this level of precision in the estimate borders on the absurd. Given the large +/- uncertainties in each of the no-project and project estimates (likely well over 50%), there is no statistical significance of the 5.48% "benefit" in Scenario A or of the even smaller 3.93% "benefit" in Scenario B.

in GHGs emissions (and likely more robustly so) at a time when the planet simply cannot afford such an increase.

1. SEPA Standards for Evaluating Greenhouse Gas Emissions.

SEPA and its implementing regulations explicitly require consideration of direct and indirect climate impacts. *See* RCW 43.21C.030(f) (directing agencies to "recognize the world-wide and long-range character of environmental problems"); WAC 197-11-444 (listing "climate" among elements of the environment that must be considered in SEPA review). Agencies are required to assess both the direct and indirect impacts of each proposed project.

In 2008, a working group appointed by the Governor provided a list of recommendations for ensuring that climate change would be considered in meeting SEPA's directives.[10] Those recommendations identified the following categories of GHG emissions to be considered under SEPA: 1) off-site mining of materials purchased for the project; 2) transportation of raw materials to the project, and transport of the final product offsite; 3); use of products sold by the Project proponent(s) to consumers or industry, including emissions generated from combustion of fuels manufactured or distributed by the facility.

The Washington State Department of Ecology has issued SEPA guidance for its own consideration of GHG emissions.[11] That guidance makes clear that SEPA requires climate change to be considered in an environmental analysis. Ecology's guidance provides that SEPA documents are to consider whether a proposed Project will significantly contribute to GHG concentrations.

Under SEPA, an "agency cannot close its eyes to the ultimate probable environmental consequences of its current action." *Cheney v. City of Mountlake Terrace*, 87 Wn.2d 338, 344, 552 P.2d 184 (1976). In fact, the SEPA regulations specifically direct that an "agency shall not limit its consideration of a proposal's impacts only to those aspects within its jurisdiction, including local or state boundaries." WAC 197-11-060(4)(b).[12] SEPA also constitutes an affirmation of Washington's connectedness to the rest of the planet; it explicitly calls on responsible agencies to "[r]ecognize the ***world-wide*** and ***long-range*** character of environmental problems" and take steps to cooperate in "anticipating and preventing a decline in the quality of the ***world*** environment." RCW 43.21C.030(f) (emphasis added); *see also Eastlake Comm. Coun. v. Roanoke Assoc.*, 82 Wn.2d 475, 487, 513 P.2d 36 (1973) (observing "unusually vigorous statement of legislature purpose ... to consider the ***total*** environmental and ecological factors ***to their fullest*** in deciding major matters") (emphasis added).

SEPA's regulations recognize that environmental impacts do not end at the state's borders; the SEPA regulations explicitly require that the lead agency consider the impacts of proposed projects beyond the state's geographic jurisdiction. *See* WAC 197-11-060(4)(c); *Cathcart-*

[10] Available at: http://www.ecy.wa.gov/climatechange/docs/sepa/20110603_SEPA_GHGinternalguidance.pdf.

[11] Available at: http://www.ecy.wa.gov/climatechange/sepa.htm.

[12] PSCAA Reg. 1, Art. 2 § 2.02 adopts this regulation by reference.

0865-7 7. SEPA Alternatives
0865-8 8. No Action Alternative

Maltby-Clearview Comm. Council v. Snohomish Cty., 96 Wn.2d 201, 209 (1981) (SEPA "also mandates that extra-jurisdictional effects be addressed and mitigated, when possible.").

Recently, the Washington Shorelines Hearings Board held that that failure to adequately analyze the full scope of a proposed project's greenhouse gas impacts constitutes grounds for invalidating issued permits. *See Columbia Riverkeeper et al. v. Cowlitz County et al.*, SHB No. 17-010c at *18 (Sept. 15, 2018) (invalidating permits because EIS failed to adequately analyze the Project's greenhouse gas impacts). Moreover, indirect impacts of fossil fuel transportation projects must be considered in the SEPA process. For example, the Washington Shorelines Hearings Board recently invalidated a SEPA document for two proposed crude oil terminals for failing to adequately consider the cumulative and indirect impacts of rail and vessel traffic. *Quinault Indian Nation v. City of Hoquiam et al.*, SHB No. 13-021c, 2013 WL 6062377 (Nov. 12, 2013).[13]

2. The DSEIS' alternatives analysis is fatally flawed.

SEPA requires that an EIS contain a detailed discussion of alternatives to the proposed action. RCW 43.21C.030(c)(iii). The discussion of alternatives in an EIS must present sufficient information for a reasoned choice among alternatives. *E.g., Toandos Peninsula Ass'n v. Jefferson Cty.*, 32 Wn. App. 473, 483, 648 P.2d 448 (1982). Thus far, the DSEIS has not explored and objectively evaluated reasonable alternatives.

The DSEIS' alternatives analysis is fatally flawed because its baseline / no-action alternative analysis is fatally flawed. This is due to the fact that its analysis: (1) assumes a static or close-to-static view of the future for the assumed life of the project (in other words, the DSEIS assumes that circumstances, technology, etc. will remain unchanged for the next 40 years); and (2) makes simplistic assumptions about the future in the absence of the project (for example, the DSEIS assumes the no-action alternative will remain unchanged over the life of the Project). The no-action alternative analysis does not account for market-driven or regulatory-driven changes such as increasing penetration of renewables or electric vehicles or even natural gas over the next 40 years, which is not a credible approach to assessing the Project's planning horizon.

The DSEIS' no action alternative analysis assumes the same mix of marine fuels (that the DSEIS believes erroneously are currently used in the TOTE and non-TOTE vessels) will remain the same for the next 40 years. Based on this assumption, the DSEIS holds GHG emissions from all vessels burning marine fuels constant for the next forty years – for example, the emission factors for the various fuels in the main engines of the vessels for CO_2, CH_4, and N_2O[14] are not adjusted

[13] Notably, here, the DSEIS indicates the following fossil fuel transportation component of the Project: that fuel bunkering will take place on the Blair Waterway (even though this was neither included nor analyzed in the FEIS, and the DSEIS likewise fails to analyze the full suite of impacts presented by such activities taking place in the Blair Waterway).

[14] As an example, for the Scenario A worksheet, these emission factors (in g/kW-hr) for various fuels are shown in a Tab called "EF Marine Vessels spec. TOTE" in cells O8-S17. No references are provided for the source(s) of these data. We further note that, in the form presented (i.e., g/kW-hr) these emission factors include many built-in assumptions on engine-specific fuel consumption (i.e., mass of fuel burned per unit of kW-hr work), engine efficiency, and the like – all of which are implicitly held constant into the future.

0865-9 1. Determination of SEIS Scope - Comparison to FEIS
0865-10 1. Determination of SEIS Scope - Comparison to FEIS

into the future. If one assumes no improvement in air quality for the no action alternative, then the benefits of the Project will be exaggerated – and unjustifiably so because it is not reasonable to assume static conditions over the next forty years.

Collectively, by speculatively and implausibly minimizing future GHG reductions in the no action alternative, the DSEIS inaccurately exaggerates the benefits the of the proposed Project. In a proper analysis, a set of plausible no action alternatives would embrace a realistic view of the next forty years, with varying levels of penetration of renewable marine fuels such as greenhouse gas-friendly biodiesels and improvements in engine efficiency (which would have lower greenhouse gas emissions).

Comparing futures involving penetration of renewables into the market (i.e., a non-static no-action alternative) with the Scenario in which the LNG project is operational is more plausible than the DSEIS' current approach. Thus, here, the DSEIS' no action alternative analysis needs to acknowledge the use of lower-GHG emitting fuel in the future for marine vessels, including TOTE vessels, and account for the resulting lower GHG emissions from vessel engines over the next 40 years. The SEIS then needs to articulate how this correction impacts its analysis.

Further, the DSEIS does not make clear what energy efficiency reductions will result if, in connection with the assumed bunkering, LNG is used in the already-existing engines of the vessels that the DSEIS assumes. The DSEIS should indicate how accounting for these reductions in efficiency impacts the "benefits" (3.93% in Scenario B and 5.48% in Scenario A) it postulates.

Due to these significant shortcomings, the DSEIS fails to properly frame the alternatives that PSCAA is to consider in making its permitting decision. Consequently, the DSEIS fails in its basic function of providing the decisionmaker with the information needed to make an informed choice. Such failure is fatal to an EIS. *See, e.g., Blair v. City of Monroe*, GMHB No. 14-3-0006c (Sept. 19, 2014) 2014 WL 5309146, at *16 ("Without a properly-framed set of alternatives, the City's nonproject environmental review simply ***fails to provide decision makers with the information to make an informed choice*** about the land use designation for the East Monroe Property") (emphasis added).

3. The scope of the proposed Project in the DSEIS is not consistent with the scope of the proposed Project in the FEIS – related incorrect assumptions further undermine the DSEIS' no action alternative analysis.

The scope of the project in the DSEIS is not consistent with the FEIS in two material respects. As a result of these discrepancies and the DSEIS' related incorrect assumptions, the DSEIS improperly and self-servingly exaggerates the Project's GHG benefits.

First, the DSEIS includes bunkering of LNG in the Blair Waterway to an unidentified population of assumed marine customers. [DSEIS, p. I (SEPA Fact Sheet, first bullet)]. The DSEIS relies upon use of LNG in ships other than TOTE vessels – which assumed vessels will obtain the LNG from the Project in the Blair Waterway – to support its analysis that the Project results in reduced GHG emissions.

Bunkering barges in the Blair Waterway is an aspect of the Project that was not included in prior Project determinations. The intensified vessel traffic on the Blair Waterway, which is an unavoidable consequence of the bunkering activities envisioned by the DSEIS, has not been analyzed in any environmental impact statement.

Further, discussion and assumptions in the DSEIS concerning bunkering barges assumes that there will be a market for LNG as vessel fuel in this region and that vessels will be calling on the Tacoma LNG facility for that purpose. However, the DSEIS provides no support for this key foundational underpinning of its analysis. Further, in assuming the existence of a market, the DSEIS fails to account for the fact that the expected market for LNG as a vessel fuel for compliance with the North American Emission Control Area has not materialized as expected. Thus, contrary to taking a "hard look," the DSEIS' has ignored important information which has resulted in an over-estimation of GHG emissions reductions from bunkering. The SEIS needs to consider a scenario in which there is no market for LNG as a vessel fuel in this region.[15]

Further, the Blair Waterway bunkering assumption is also belied by what project proponent Puget Sound Energy ("PSE") has communicated to the City of Tacoma. As shown in the correspondence **attached to these comments as Appendix C** from PSE to the City in July of 2016, Puget Sound Energy expressly denied that the proposed Project would load bunker barges in the Blair Waterway.[16]

Therefore, the stated scope of the Project (which has been publicly confirmed by PSE's representations to the City of Tacoma) contradicts the current SEPA review to the extent the DSEIS' analysis includes vessel bunkering in the Blair Waterway. Accordingly, to make the DSEIS consistent with impacts analyzed under SEPA and PSE's public representations concerning activities in the Blair Waterway, the DSEIS needs to be revised by removing the "Other" marine vessel bunkering possibility included in Table 4-5 of the DSEIS. Notably, without non-TOTE vessels using LNG, it appears the Project presents a significant increase in GHG emissions when compared to the respective no action alternatives in either Scenario A or B. In Table 4-5 of the DSEIS, combining the lines pertaining to the "Other Marine Vessels" under Upstream Life Cycle and End Use, the benefit from these "Other Marine Vessels" alone is 94,561 tonnes/year in Scenario A and 275,415 tonnes/year in Scenario B. Eliminating these two lines in Table 4-5 yields the following result: **the Project represents a net increase in GHG emissions** of 54,665 tonnes/year for Scenario A and 218,710 tonnes/year for Scenario B.

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[15] Such a scenario is not already considered by the DSEIS' No Action Alternative analysis because that analysis assumes vessels that would otherwise receive fuel from LNG bunkering operations will run on bunker fuel and/or marine diesel fuel for the next forty years. As discussed throughout this document, that is not a valid or reasonable view for the DSEIS to take.

[16] As shown in **Appendices E and F**, PSE also made such representations to Washington's Shorelines Hearings Board. Appendix E contains briefing submitted by PSE to the Shorelines Hearings Board had no future plans to expand activities in the Blair Waterway beyond the single LNG fueling facility on the Blair Waterway that would operate eight hours a week and was designed to fuel a single type of vessel, the two ships operated by TOTE. *See* Appendix E, p. 3 – 5. Specifically, PSE states in its briefing "there is not, and has never been, a proposal for a barge loading and bunkering facility on the Blair Waterway." *Id.* at p. 5, lines 20-21. Appendix F contains hearing testimony from PSE's own witnesses to the Shorelines Hearings Board stating that loading of bunkering barges or other ships would not be possible from the Blair Waterway absent changes to the facility.

0865-11 1. Determination of SEIS Scope - Comparison to FEIS
0865-12 13. LCA Inputs and Assumptions - Natural Gas Source
0865-13 13. LCA Inputs and Assumptions - Natural Gas Source

Second, the DSEIS analyzes an increased overall daily throughput of LNG (*i.e.*, the scenario of 500,000 gallons per day) from the facility in Scenario B. This constitutes a significant departure from what was previously analyzed,[17] and this departure is highly improper. As Table 4-5 makes clear, the purpose of this self-serving scenario is to exaggerate the benefit of the proposed Project in Scenario B by allowing for additional bunkering of non-TOTE vessels in the Blair Waterway. It is also improper to include this scenario because its many additional environmental impacts (including emissions of non-greenhouse gases, criteria pollutants, air toxics – and potential increased safety hazards such as flammability and toxicity etc.) have not been analyzed in any prior project environmental analyses.

4. The DSEIS understates the upstream GHG impacts of gas sourced from British Columbia and fails to demonstrate that the proposed condition of requiring natural gas from British Columbia is enforceable.

In order to ensure that the proposed Project does not represent a net increase in GHG emissions, the DSEIS urges the following condition in the NOC Order of Approval for the LNG facility: that the facility be required to use only natural gas supplied from British Columbia. [DSEIS, p. 4-13]. Tethering the SEIS' conclusions to the assumption that all natural gas will be sourced from British Columbia for the entire assumed life of the Project (40 years) is not reasonable.

First, the DSEIS' analysis assumes (relying mainly on industry data) that the existence of provincial regulations ensures certain reduced impacts as a result of sourcing natural gas from British Columbia. That assumption, however, lacks a legitimate foundation. In fact, there exists a great deal of countervailing information indicating that natural gas from British Columbia is not likely to be as "clean" as the DSEIS' analysis indicates – this is particularly so when one considers the fact that the DSEIS relies on older, unsupported, and outdated information in the underlying GREET, GHGenius and other models. On this, the Tribe's primary concerns are: (1) the lack of accurate data on GHG impacts from natural gas extraction, processing, and transmission in British Columbia; and (2) perhaps more materially, the increasing evidence of significant methane leakage (*i.e.*, fugitive methane emissions) from such activities. We provide the following assessment.

In a recent and extensive field measurement campaign, significant methane leakage was measured from both existing and abandoned fracking wells in British Columbia:

> "...information on current emissions from Canadian unconventional developments is lacking. This study examined the incidence of methane in an area of unconventional natural gas development in northwestern Canada. In August to

[17] For example, the November 9, 2015 EIS for the project does not define or analyze these two specific scenarios. Rather, it contained vague wording that "the Tacoma LNG Facility would be constructed and produce between approximately 250,000 and 500,000 gallons of LNG per day, for use by marine customers, including TOTE, as well as regasification into the PSE natural gas distribution system for peak-shaving purposes...". [FEIS, p. II]. The only references to the 500,000 gallons appear on pages p. II, p. 1, p. 1-1, p. 1-2, p. 2-1 of the 2015 FEIS. The exact allocation of the LNG between TOTE and non-TOTE vessels was never specified (nor was it analyzed) in the FEIS or other documents.

> September 2015 we completed almost 8000 km of vehicle-based survey campaigns on public roads dissecting developments that mainly access the Montney formation in northeastern British Columbia....Roughly 47% of active wells emitted methane-rich plumes above our minimum detection limit. Abandoned and underdevelopment well sites also emitted methane-rich plumes, but the incidence rate was below that of producing wells. Multiple sites that pre-date the recent unconventional Montney development were found to be emitting, and in general we observed that older infrastructure tended to emit more often (per unit)...Extrapolating our results across the Montney development, we estimate that the emission sources we located...contribute more than 111,800 tonnes of methane annually to the atmosphere. This value exceeds reported bottom-up estimates of 78,000 tonnes for all oil and gas sector sources in British Columbia, of which the Montney represents about 55% of production."[18]

Notably, the estimate of methane emissions just from the Montney formation wells (surveyed by the authors of the report) exceeded the total BC prior estimates by over 33,800 tonnes/year (or over 43%). The Pembina Institute in Canada has recently (in 2017) opined on the state of GHG emissions, their increases, methane leakage, and the ineffectiveness of Canada's policies and regulations in decreasing these emissions from the oil and gas sector:

> "Carbon pollution associated with natural gas can increase materially if methane is leaked or vented to the atmosphere. The largest source of industrial methane emissions is the oil and gas industry, where methane can leak from wells, pipelines, and other facilities, including LNG export terminals...The production of natural gas — extraction, processing, transportation, and, for LNG, liquefaction — is energy and emissions intensive."[19]

Pembina goes on to say:

> "There are several existing and forthcoming policies in place in B.C. that are designed to reduce emissions from LNG and associated upstream development. However, these policies, summarized below, fall short of requiring projects to adopt best practices and technologies."[20]

Pembina further provides:

> "This Pembina Institute analysis using the B.C. Shale Scenario Tool includes all existing and proposed policies, including policy commitments made in B.C.'s 2016 Climate Leadership Plan on reducing methane emissions and electrifying upstream

[18] Atherton, E., et. al., Mobile measurement of methane emissions from natural gas developments in Northeastern British Columbia, Canada, Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-109, 2017.

[19] Heerema, Dylan, et. al., Liquefied natural gas, carbon pollution, and British Columbia in 2017, Pembina Institute, 2017.

[20] *Ibid.*, p. 8

operations. It assumes almost all incremental natural gas production to supply the LNG terminals comes from the low formation CO2 Montney deposit. Upstream emissions increase with age, as older wells become less efficient and therefore more polluting."[21]

The Pembina findings are not new. Others such as the Canadian Center for Policy Alternatives have noted the same concerns, as well as the fact that GHG emissions have been increasing[22] from the oil and gas sector in Canada:

> "Trends moving in the wrong direction include emissions growth from the extraction and processing of fossil fuels. Combustion emissions from fossil fuel industries rose to 5.4 Mt (up 4.3%) and those from mining and oil and gas extraction rose to 1.7 Mt (up 24%). Fugitive emissions (non-combustion emissions from extraction, production and transportation) rose by 8.2% to 6.2 Mt (the bulk of these emissions are from oil and gas, plus some emissions from coal mining).
>
> There is some controversy over the amount of additional fugitive emissions from fracking. One widely-reported estimate put methane leakages at between 3.6% and 7.9% of life cycle production, including leakages during the well completion stage, as well as leaks from equipment, plus other fugitive emissions associated with processing, transport by pipeline and distribution. Recent fieldwork in Colorado by the US National Oceanic and Atmospheric Administration appears to validate these estimates.
>
> An important caveat is that there are no real-world data for BC (at least, not in the public domain).
>
> As noted above, leakages of methane in the extraction and processing phase of unconventional gas development could mean that, on a life-cycle basis, natural gas from unconventional sources is equivalent to or even worse than coal per unit of energy. Clearly, there is more empirical research needed to estimate actual leakages in BC shale and tight gas fields. It is estimated that if 3.2% of gas leaks, that wipes out any GHG advantage relative to coal."[23] (internal citations omitted)

In 2017, reporting from Environment Canada (EC) further confirmed concerns regarding leakage of methane from oil and gas exploration in Canada – and from British Columbia specifically – relying on airborne emissions surveys in the Horn River Basin. EC concluded that:[24]

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[21] *Ibid.*, p. 10.

[22] That these trends continue is also confirmed by the most recent (through 2015) data available from the BC government. *See* the provincial inventory at: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory .

[23] Canadian Center for Policy Alternatives, BC's Legislated Greenhouse Gas Targets vs Natural Gas Development – The Good, The Bad, The Ugly, October 2012.

[24] Shao-Meng Li, Shale Petroleum Development: Air Emissions and Implications, Air Quality Research Division

0865-14 13. LCA Inputs and Assumptions - Natural Gas Source
0865-15 6. Purpose and Need

(1) greenhouse gas emission sources included the methane leakage and flaring/venting; (2) there were high emissions of CO2 and CH4 from gas plants and higher emission rates for CO2 compared to company reports; and (3) emissions from continued oil and gas productions from fracked wells can be significant.

Notwithstanding these increasing GHG emissions from the oil and gas sector in British Columbia, the DSEIS analysis assumes that natural gas from British Columbia (with a CO_2e emission rate of 9,754 g/mmBtu, HHV basis) would be substantially lower-emitting than US-sourced natural gas[25] with a corresponding CO_2e emission rate of 11,499.1 g/mmBtu, HHV basis.[26] There is no reason to accept or agree with this key unsupported assumption in the DSEIS.

Second, the DSEIS makes no showing and undertakes no analysis establishing that this recommended "sole source" requirement is something that PSCAA can lawfully require and enforce. The Tribe is concerned that PSCAA does not have the authority: (1) to require that the project proponents only obtain "the natural gas supplied to the facility" from British Columbia; or (2) to enforce such a condition. Regarding enforceability, while the DSEIS suggests that the sourcing of gas from British Columbia should be made into a permit condition by PSCAA, the DSEIS does not describe how such a condition would be enforceable.

The enforceability concern is exacerbated by: (1) the fact that the natural gas pipe network enables the Project to receive gas from many geographic locations other than British Columbia; and (2) the lack of distinguishability of natural gas from different geographic locations. In short, the DSEIS fails to show that its "recommended" condition is meaningful and enforceable, rather than illusory. Even if natural gas derived from British Columbia is as clean as the DSEIS suggests (which the preceding paragraphs indicate is doubtful) – without adequately addressing whether PSCAA can actually force PSE to obtain its natural gas from British Columbia and hold it to that commitment, the DSEIS cannot begin to provide assurance that the facility's GHG impacts can or will be mitigated by the recommended "sole source" condition.

5. The DSEIS makes incorrect assumptions regarding the "need" for the Project and the GHG impacts related to those purported needs.

An EIS must "specify[] the purpose and need to which the proposal is responding …." WAC 197-11-440(4). In its analysis, the DSEIS appears to suggest the Project is needed for peak shaving and for TOTE vessels to comply with MARPOL. [DSEIS, p. 2 (Objectives, Purpose, and Need)].

(a) Peak Shaving is not shown to constitute a "need." No technical support is provided for this bedrock rationale for the Project – namely, that the LNG from the Project will displace dirtier fuels that have to be used during periods of peak electricity demand (*i.e.*, "peak shaving"). There are presently – and certainly will be in the future – myriad fuel options cleaner than LNG that will be available for peak shaving such as demand-side management, battery storage, and import of

Science and Technology Branch, Environment and Climate Change Canada, March 2017.

[25] For the entirety of the Project lifetime of 40 years.

[26] Per the GREET Model workpaper spreadsheet provided to us.

renewable-based power from the western United States (to name a few). The DSEIS does not consider these cleaner fuel sources, which is particularly problematic given that sources like renewables (solar and wind) are cleaner than natural gas. If LNG displaces the use of renewables during periods of peak demand, the project represents a harm rather than a benefit from a GHG emissions perspective. Instead of assuming static conditions for the next 40 years, which assumption is neither plausible nor reasonable, the SEIS' analysis needs to be corrected to include scenarios where peak shaving needs are met to an appreciable degree by renewable energy sources.

Further, the purported benefits the DSEIS associates with peak shaving are speculative and unjustified. Per Table 4-5, considering both the upstream and end use aspects of peak shaving, Scenario A shows a benefit of 31,021 tonnes/year (out of a total benefit of 39,896 tonnes/year) and Scenario B shows a benefit of 33,195 tonnes/year (out of a total benefit of 56,705 tonnes/year). Thus, the purported benefits from this assumed peak shaving aspect are significant. But peak shaving will still occur under the no-project alternative because of the substantial margins required by the operators of the United States' electrical grid[27] and because of the rise of renewables and storage in that grid. Accordingly, the added "peak shaving" benefit from the project is not justified as a project driver. Rather, like the 'Other" marine vessel bunkering, it appears to have been included to ensure that the project shows a small net benefit.

(b) The project is not needed for TOTE vessels (or other vessels) to comply with MARPOL. The DSEIS also appears to assume the Project is necessary for TOTE vessels to achieve compliance with MARPOL. [DSEIS, p. 2 (discussing "new fuel standards for maritime vessels in response to the North American Emission Control Area")]. The DSEIS is incorrect. On October 31, 2016, the United States Coast Guard and Environmental Protection Agency notified Totem Ocean Trailer Express (TOTE) that its MARPOL exemption was being revoked, effective November 30, 2016. *See* Oct. 31, 2016 letter from EPA to Totem Ocean Trailer Express Re: MARPOL Annex VI, Regulation Exemption Permit, which **is attached to these comments as Appendix D**. The result of that revocation is that, as of December 1, 2016, the two TOTE vessels comprising part of the DSEIS' analysis have not been allowed to run on the bunker fuel and/or marine diesel fuel that the DSEIS appears to envision in its analysis. Rather, the two TOTE vessels are now required to run on MARPOL-compliant fuel.

Thus, the DSEIS' view of this basic project driver is completely incorrect at this juncture. To the extent the DSEIS' analysis of the no action alternative assumes the TOTE vessels will run on the fuel permitted by the revoked MARPOL exemption, that portion of the DSEIS' analysis needs to be corrected / updated to reflect actual circumstances (*i.e.*, TOTE vessels running on MARPOL-compliant fuel under the no action alternative).

6. The DSEIS underestimates GHG emissions from flaring.

The DSEIS uses emission factors that do not properly account for the large quantities of nitrogen that will be present in the gases to be flared at the LNG facility. Specifically, the standard flaring emission factors were derived from hydrocarbon-rich fuels. In the Project's proposed terminal, flare gases will likely consist of significant quantities of nitrogen since it is proposed as

[27] For example, reserve margins are generally at 15% or higher throughout the western United States. *See* https://www.nerc.com/pa/RAPA/ri/Pages/PlanningReserveMargin.aspx.

0865-17 14. LCA Inputs and Assumptions - Leakage/Slippage
0865-18 12. LCA Inputs and Assumptions - Global Warming Potential Value
0865-19 15. LCA Inputs and Assumptions - Natural Gas Properties

a purge gas in many instances.[28] Combusting this nitrogen-rich flare gas will create significant quantities of N_2O, a potent greenhouse gas with approximately 300 (or more) times the global warming potential of to CO_2. In underestimating N_2O emissions from the terminal operations, it appears the DSEIS materially underestimates GHG emissions from the Project in this additional way.

7. Additional instances of technical flaws in the DSEIS.

(a) The DSEIS makes unsupported assumptions regarding fugitive emissions releases at the terminal and how they have been quantified. Proper quantification of fugitive emissions from components such as pump seals, valves, flanges, and the like requires a detail count of such components – which are subject to change up until the design of the terminal is final. Because the facility design is not yet final, assumptions regarding component counts must be regarded as preliminary or place-holders. Therefore, the estimates of fugitive emissions are also preliminary, not firm figures upon which PSCAA can rely.

(b) The DSEIS utilizes outdated global warming potential (GWP) values in its analyses. Instead of using the current, IPCC Assessment Report (AR) 5 value, it uses an earlier AR4 value for methane. At the very least, that value should be corrected to reflect the most current science. In addition, given the short half-life for CH_4, an important GHG in this analysis, the sensitivity of using the 20-year GWP for methane should have been analyzed rather than only using the 100-year GWP of methane. The 20-year GWP is also more compatible with the expected 40-year life of the project.

(c) The DSEIS makes many unsupported assumptions (especially for the next 40 years) relating to the GHG impacts of non-LNG fuels, such as the current petroleum-based fuels used in transportation and electricity generation. This includes assumptions regarding: (1) the source of the crude oil that is used to derive transportation fuels and (2) the fuel-mix for electricity generation.

(d) The DSEIS uses outdated assumptions regarding the mix of shale and non-shale gas contributions to the overall natural gas supply in the United States. For example, Table B.2 shows that the natural gas supply from shale was 51.5% in 2016, and is projected to rise to 55.2% in 2040, per the underlying GREET1_2017 model used in the analysis. [Appendix C to DSEIS, p. 101] However, a simple check of the EIA website reveals that this assumption cannot be correct. The EIA notes: "[T]he U.S. Energy Information Administration (EIA) estimates that in 2017, about 16.86 trillion cubic feet (Tcf) of dry natural gas was produced from shale resources in the United States. This was about 62% of total U.S. dry natural gas production in 2017."[29] Thus, the assumption in Table B.2 that the shale contribution to natural gas supply would top out at 55.2% in 2040 is simply wrong because it is already at 62% in 2017. This demonstrates the lack of reliability in the GREET model in this instance and, therefore, in its output in the DSEIS.

8. The Draft SEIS is so inadequate that redoing it would be consistent with (if not compelled by) SEPA.

[28] Braemar, Tacoma LNG Fire and Safety Review, July 2, 2018.
[29] https://www.eia.gov/tools/faqs/faq.php?id=907&t=8

0865-20 10. LCA Calculations
0865-21 2. Determination of the SEIS Scope

The DSEIS is incomplete, inaccurate, and unreliable. There are numerous places in which the DSEIS contains incomplete information or states that more data is needed from PSE. *See, e.g.*, DSEIS Tables 2.3 and C.1. Other instances of the DSEIS' incompleteness include coding errors and cryptic comments in the spreadsheet workpapers.

PSCAA should also note that the Tribe and its consultant, Dr. Sahu, were unable to verify many aspects of the spreadsheets provided by PSCAA in connection with this review because: (1) the provided spreadsheets were "protected" and, thus, not interactive; and (2) in many instances, formulas underlying figures depicted in the spreadsheets were not provided, which precluded the ability to trace-back and/or verify the underlying calculations.

The public should not be expected or required to comment on incomplete information. PSCAA similarly should not act on incomplete information.

The Tribe respectfully urges PSCAA to pause the SEPA process and reissue **a complete draft SEIS** for the public to review and comment upon, along with all of the work papers in a format that can be meaningfully analyzed by the public. PSCAA Reg. 1, Art. 2 § 2.08 ("Before the Agency issues an EIS, the responsible official shall be satisfied that it complies with this regulation and chapter 197-11 WAC").

V. CONCLUSION

The DSEIS fails to meet SEPA's requirements as described above. The Tribe respectfully requests that PSCAA begin this process anew and conduct a credible analysis upon which the public can then comment. In doing so, PSCAA should: (1) consult with the Tribe prior to moving forward with the public comment period; (2) start from a consistent project scope; (3) solicit expert opinion on critical assumptions underlying the analysis; (4) use stochastic methods where the future is inherently uncertain; (5) present results as a range of outcomes (as opposed to single-point estimates); (6) identify the most sensitive inputs that drive the conclusions; and (7) conduct sensitivity analyses for those inputs/assumptions as well as their resultant impact on the SEIS' conclusions. Only then will the SEIS have any regulatory meaning and value for the purpose of informed decision-making.

To date, a credible SEPA analysis has not been performed. As a result of the issues, flaws and shortcomings discussed above, the DSEIS is a misleading document that presents a biased, pro-Project view that compromises PSCAA's ability to discharge its delegated decision-making responsibilities because the document does not make PSCAA fully aware of the GHG consequences of the proposed action.

APPENDIX A

PUYALLUP TRIBE OF INDIANS

PUYALLUP TRIBAL COUNCIL
RESOLUTION NO. 14 11 18-A

WHEREAS, the Puyallup Tribe has existed since creation as the aboriginal people who are the owners and guardians of their lands and waters; and

WHEREAS, the Puyallup Tribe is an independent sovereign nation, having historically negotiated with several foreign nations including the United States in the Medicine Creek Treaty; and

WHEREAS, the Puyallup Tribal Council is the governing body of the Puyallup Tribe in accordance with the authority of its sovereign rights as the aboriginal owners and guardians of their lands and waters, reaffirmed in the Medicine Creek Treaty, and their Constitution and Bylaws, as amended and approved by the Tribe and the Assistant Secretary of the Interior; and

WHEREAS, the Puyallup Tribe has a primary interest in protecting and preserving its environment and natural resources, which are integral components of the Tribe's economic, social, cultural and spiritual life, and the Tribal Council is aware that activities both on and near the Puyallup Reservation ("Reservation") may adversely affect these resources and values, and may impair the health and welfare of the Reservation population. Off-Reservation activities may adversely affect the Tribe's Treaty fishery rights and other cultural and spiritual interests of the Tribe; and

WHEREAS, the Puyallup Tribe's land base within the Reservation is limited and, therefore, the siting of the LNG Plant with its significant risks to the Tribe's members' health and welfare, the Tribe's resources and values, and the Tribe's fishery right and other cultural and spiritual interests poses risk of significant harm to the Tribe and its members who have for time immemorial occupied these lands and cannot just move away from these lands adjacent to the LNG plant; and

WHEREAS, the Proposed LNG project presents significant risks to human life, property, cultural resources, and natural resources particularly when sited in a densely populated urban environment and the Tribal Reservation; and

WHEREAS, the Puyallup Tribe has identified to both PSCAA and the City of Tacoma significant flaws in the safety and siting analyses originally performed in the Final Environmental Impact Statement prepared by the City of Tacoma; and

WHEREAS, operations for fuel loading of vessels, whether ships or barges, other than TOTE vessels were expressly excluded from the project by PSE, the project proponent; and

WHEREAS, the LNG Plant is being constructed by PSE without all the required permits to continue with construction of the tank and related facilities; and

WHEREAS, the Puget Sound Clean Air Agency has released a Draft Supplemental Environmental Impact Statement ("DSEIS") evaluating greenhouse gas emissions impacts associated with the LNG Plant which the SEIS describes as "the construction and operation of an LNG liquefaction and marine bunkering facility within the City of Tacoma … and construction of segments of a natural gas pipeline in the City of Fife and unincorporated areas of Pierce County." According to the DSEIS, it

fulfills the need for the Puget Sound Clean Air Agency ("PSCAA") to evaluate the life-cycle greenhouse gas emissions from the LNG Plant; and

WHEREAS, the Puyallup Tribe is the only entity holding significant information regarding the impacts the LNG plant will have on Tribal treaty protected resources and the health and welfare of the Tribe's members; and

WHEREAS, the PSCAA has not formally consulted with the Tribe and has not utilized information and data exclusively held by the Tribe that is necessary to PSCAA's analysis and conclusions contained within the SEIS; and

WHEREAS, the SEIS is based on a project that has changed significantly in scope since it was first analyzed in an Environmental Impact Statement prepared by the City of Tacoma; and

WHEREAS, the DSEIS fails to use the best available science and relies on technical assumptions that are either incorrect or unsupported, or both; and

WHEREAS, there are no identified alternatives to the proposal that will reduce the risks to Tribal Members, the public as a whole, human life, and property; and

WHEREAS, the Puyallup Tribe has determined there are significant flaws in the analysis contained in the DSEIS that renders its conclusions invalid;

BE IT RESOLVED, the Tribal Council of the Puyallup Tribe of Indians hereby declares:

1. The Puyallup Tribe remains strictly opposed to the Puget Sound Energy's Proposed LNG Plant on the Tacoma Tideflats; and

2. The Puyallup Tribe is providing comments to the Puget Sound Clean Air Agency on its DSEIS and requesting the draft be rescinded and, following formal consultation with the Tribe, be replaced with a revised and corrected draft for public comment that has complete information, uses best available science, and corrects erroneous and baseless assumptions; and

3. The Puyallup Tribe respectfully but forcefully requests that PSCAA and the City of Tacoma take the time to fully analyze the safety concerns that the proposed project presents to the Tribe and the broader Tacoma community that have been identified by the Tribe's Consulting Expert and expand the environmental analysis in a new and distinct Supplemental EIS; and

4. The Puyallup Tribe resolves to request that until such items are analyzed and all permits for construction are issued, that the PSCAA and the City of Tacoma issue the necessary stop work directives to the applicants and all work on the project cease to address all deficiencies in permitting and underlying environmental impact analyses.

BE IT FINALLY RESOLVED, the Tribal Council of the Puyallup Tribe of Indians authorizes the Tribal Council Chairman (Bill Sterud), and in his absence, the Vice-Chairman (David Bean), to execute this Resolution and other implementing instruments, or amendments, required on behalf of the Tribe.

CERTIFICATION

I, Lynda Squally, Secretary of the Puyallup Tribal Council of the Puyallup Reservation do hereby certify that the above Resolution was duly adopted at a Regular Meeting of the Puyallup Tribal Council held on the Puyallup Indian Reservation on the 14th day of November 2018, a quorum being present with a vote of 4 **FOR**, 0 **AGAINST**, 0 **ABSTAINING**, and 1 **NOT VOTING** its adoption.

Lynda Squally
Secretary, Puyallup Tribal Council

ATTEST:

Bill Sterud
Bill Sterud, Chairman
Puyallup Tribal Council

APPENDIX B

RANAJIT (RON) SAHU, Ph.D, QEP, CEM (Nevada)

CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES

311 North Story Place
Alhambra, CA 91801
Phone: 702.683.5466
e-mail (preferred): sahuron@earthlink.net

EXPERIENCE SUMMARY

Dr. Sahu has over twenty eight years of experience in the fields of environmental, mechanical, and chemical engineering including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources including stationary and mobile sources; soils and groundwater remediation including landfills as remedy; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance (involving statutes and regulations such as the Federal CAA and its Amendments, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes); transportation air quality impact analysis; multimedia compliance audits; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.), multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.

He has over twenty five years of project management experience and has successfully managed and executed numerous projects in this time period. This includes basic and applied research projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public.

He has provided consulting services to numerous private sector, public sector and public interest group clients. His major clients over the past twenty five years include various trade associations as well as individual companies such as steel mills, petroleum refineries, cement manufacturers, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, and various entities in the public sector including EPA, the US Dept. of Justice, several states, various agencies such as the California DTSC, various municipalities, etc.). Dr. Sahu has performed projects in all 50 states, numerous local jurisdictions and internationally.

In addition to consulting, Dr. Sahu has taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management) for the past seventeen years. In this time period he has also taught at Caltech, his alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).

Dr. Sahu has and continues to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies (please see Annex A).

EXPERIENCE RECORD

2000-present **Independent Consultant.** Providing a variety of private sector (industrial companies, land development companies, law firms, etc.) public sector (such as the US Department of Justice) and public interest group clients with project management, air quality

consulting, waste remediation and management consulting, as well as regulatory and engineering support consulting services.

1995-2000 Parsons ES, **Associate, Senior Project Manager and Department Manager for** Air Quality/Geosciences/Hazardous Waste Groups, Pasadena. Responsible for the management of a group of approximately 24 air quality and environmental professionals, 15 geoscience, and 10 hazardous waste professionals providing full-service consulting, project management, regulatory compliance and A/E design assistance in all areas.

Parsons ES, **Manager for Air Source Testing Services**. Responsible for the management of 8 individuals in the area of air source testing and air regulatory permitting projects located in Bakersfield, California.

1992-1995 Engineering-Science, Inc. **Principal Engineer and Senior Project Manager** in the air quality department. Responsibilities included multimedia regulatory compliance and permitting (including hazardous and nuclear materials), air pollution engineering (emissions from stationary and mobile sources, control of criteria and air toxics, dispersion modeling, risk assessment, visibility analysis, odor analysis), supervisory functions and project management.

1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department. Responsibilities included permitting, tracking regulatory issues, technical analysis, and supervisory functions on numerous air, water, and hazardous waste projects. Responsibilities also include client and agency interfacing, project cost and schedule control, and reporting to internal and external upper management regarding project status.

1989-1990 Kinetics Technology International, Corp. **Development Engineer.** Involved in thermal engineering R&D and project work related to low-NOx ceramic radiant burners, fired heater NOx reduction, SCR design, and fired heater retrofitting.

1988-1989 Heat Transfer Research, Inc. **Research Engineer**. Involved in the design of fired heaters, heat exchangers, air coolers, and other non-fired equipment. Also did research in the area of heat exchanger tube vibrations.

EDUCATION

1984-1988 Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.

1984 M. S., Mechanical Engineering, Caltech, Pasadena, CA.

1978-1983 B. Tech (Honors), Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India

TEACHING EXPERIENCE

Caltech

"Thermodynamics," Teaching Assistant, California Institute of Technology, 1983, 1987.

"Air Pollution Control," Teaching Assistant, California Institute of Technology, 1985.

"Caltech Secondary and High School Saturday Program," - taught various mathematics (algebra through calculus) and science (physics and chemistry) courses to high school students, 1983-1989.

"Heat Transfer," - taught this course in the Fall and Winter terms of 1994-1995 in the Division of Engineering and Applied Science.

"Thermodynamics and Heat Transfer," Fall and Winter Terms of 1996-1997.

U.C. Riverside, Extension

"Toxic and Hazardous Air Contaminants," University of California Extension Program, Riverside, California. Various years since 1992.

"Prevention and Management of Accidental Air Emissions," University of California Extension Program, Riverside, California. Various years since 1992.

"Air Pollution Control Systems and Strategies," University of California Extension Program, Riverside, California, Summer 1992-93, Summer 1993-1994.

"Air Pollution Calculations," University of California Extension Program, Riverside, California, Fall 1993-94, Winter 1993-94, Fall 1994-95.

"Process Safety Management," University of California Extension Program, Riverside, California. Various years since 1992-2010.

"Process Safety Management," University of California Extension Program, Riverside, California, at SCAQMD, Spring 1993-94.

"Advanced Hazard Analysis - A Special Course for LEPCs," University of California Extension Program, Riverside, California, taught at San Diego, California, Spring 1993-1994.

"Advanced Hazardous Waste Management" University of California Extension Program, Riverside, California. 2005.

Loyola Marymount University

"Fundamentals of Air Pollution - Regulations, Controls and Engineering," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1993.

"Air Pollution Control," Loyola Marymount University, Dept. of Civil Engineering, Fall 1994.

"Environmental Risk Assessment," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1998.

"Hazardous Waste Remediation" Loyola Marymount University, Dept. of Civil Engineering. Various years since 2006.

University of Southern California

"Air Pollution Controls," University of Southern California, Dept. of Civil Engineering, Fall 1993, Fall 1994.

"Air Pollution Fundamentals," University of Southern California, Dept. of Civil Engineering, Winter 1994.

University of California, Los Angeles

"Air Pollution Fundamentals," University of California, Los Angeles, Dept. of Civil and Environmental Engineering, Spring 1994, Spring 1999, Spring 2000, Spring 2003, Spring 2006, Spring 2007, Spring 2008, Spring 2009.

International Programs

"Environmental Planning and Management," 5 week program for visiting Chinese delegation, 1994.

"Environmental Planning and Management," 1 day program for visiting Russian delegation, 1995.

"Air Pollution Planning and Management," IEP, UCR, Spring 1996.

"Environmental Issues and Air Pollution," IEP, UCR, October 1996.

PROFESSIONAL AFFILIATIONS AND HONORS

President of India Gold Medal, IIT Kharagpur, India, 1983.

Member of the Alternatives Assessment Committee of the Grand Canyon Visibility Transport Commission, established by the Clean Air Act Amendments of 1990, 1992-present.

American Society of Mechanical Engineers: Los Angeles Section Executive Committee, Heat Transfer Division, and Fuels and Combustion Technology Division, 1987-present.

Air and Waste Management Association, West Coast Section, 1989-present.

PROFESSIONAL CERTIFICATIONS

EIT, California (#XE088305), 1993.

REA I, California (#07438), 2000.

Certified Permitting Professional, South Coast AQMD (#C8320), since 1993.

QEP, Institute of Professional Environmental Practice, since 2000.

CEM, State of Nevada (#EM-1699). Expiration 10/07/2017.

PUBLICATIONS (PARTIAL LIST)

"Physical Properties and Oxidation Rates of Chars from Bituminous Coals," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **67**, 275-283 (1988).

"Char Combustion: Measurement and Analysis of Particle Temperature Histories," with R.C. Flagan, G.R. Gavalas and P.S. Northrop, *Comb. Sci. Tech.* **60**, 215-230 (1988).

"On the Combustion of Bituminous Coal Chars," PhD Thesis, California Institute of Technology (1988).

"Optical Pyrometry: A Powerful Tool for Coal Combustion Diagnostics," *J. Coal Quality*, **8**, 17-22 (1989).

"Post-Ignition Transients in the Combustion of Single Char Particles," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **68**, 849-855 (1989).

"A Model for Single Particle Combustion of Bituminous Coal Char." Proc. ASME National Heat Transfer Conference, Philadelphia, **HTD-Vol. 106**, 505-513 (1989).

"Discrete Simulation of Cenospheric Coal-Char Combustion," with R.C. Flagan and G.R. Gavalas, *Combust. Flame*, **77**, 337-346 (1989).

"Particle Measurements in Coal Combustion," with R.C. Flagan, in "**Combustion Measurements**" (ed. N. Chigier), Hemisphere Publishing Corp. (1991).

"Cross Linking in Pore Structures and Its Effect on Reactivity," with G.R. Gavalas in preparation.

"Natural Frequencies and Mode Shapes of Straight Tubes," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Optimal Tube Layouts for Kamui SL-Series Exchangers," with K. Ishihara, Proprietary Report for Kamui Company Limited, Tokyo, Japan (1990).

"HTRI Process Heater Conceptual Design," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Asymptotic Theory of Transonic Wind Tunnel Wall Interference," with N.D. Malmuth and others, Arnold Engineering Development Center, Air Force Systems Command, USAF (1990).

"Gas Radiation in a Fired Heater Convection Section," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1990).

"Heat Transfer and Pressure Drop in NTIW Heat Exchangers," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1991).

"NOx Control and Thermal Design," Thermal Engineering Tech Briefs, (1994).

"From Purchase of Landmark Environmental Insurance to Remediation: Case Study in Henderson, Nevada," with Robin E. Bain and Jill Quillin, presented at the AQMA Annual Meeting, Florida, 2001.

"The Jones Act Contribution to Global Warming, Acid Rain and Toxic Air Contaminants," with Charles W. Botsford, presented at the AQMA Annual Meeting, Florida, 2001.

PRESENTATIONS (PARTIAL LIST)

"Pore Structure and Combustion Kinetics - Interpretation of Single Particle Temperature-Time Histories," with P.S. Northrop, R.C. Flagan and G.R. Gavalas, presented at the AIChE Annual Meeting, New York (1987).

"Measurement of Temperature-Time Histories of Burning Single Coal Char Particles," with R.C. Flagan, presented at the American Flame Research Committee Fall International Symposium, Pittsburgh, (1988).

"Physical Characterization of a Cenospheric Coal Char Burned at High Temperatures," with R.C. Flagan and G.R. Gavalas, presented at the Fall Meeting of the Western States Section of the Combustion Institute, Laguna Beach, California (1988).

"Control of Nitrogen Oxide Emissions in Gas Fired Heaters - The Retrofit Experience," with G. P. Croce and R. Patel, presented at the International Conference on Environmental Control of Combustion Processes (Jointly sponsored by the American Flame Research Committee and the Japan Flame Research Committee), Honolulu, Hawaii (1991).

"Air Toxics - Past, Present and the Future," presented at the Joint AIChE/AAEE Breakfast Meeting at the AIChE 1991 Annual Meeting, Los Angeles, California, November 17-22 (1991).

"Air Toxics Emissions and Risk Impacts from Automobiles Using Reformulated Gasolines," presented at the Third Annual Current Issues in Air Toxics Conference, Sacramento, California, November 9-10 (1992).

"Air Toxics from Mobile Sources," presented at the Environmental Health Sciences (ESE) Seminar Series, UCLA, Los Angeles, California, November 12, (1992).

"Kilns, Ovens, and Dryers - Present and Future," presented at the Gas Company Air Quality Permit Assistance Seminar, Industry Hills Sheraton, California, November 20, (1992).

"The Design and Implementation of Vehicle Scrapping Programs," presented at the 86th Annual Meeting of the Air and Waste Management Association, Denver, Colorado, June 12, 1993.

"Air Quality Planning and Control in Beijing, China," presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 19-24, 1994.

Annex A

Expert Litigation Support

A. Occasions where Dr. Sahu has provided Written or Oral testimony before Congress:

1. In July 2012, provided expert written and oral testimony to the House Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology at a Hearing entitled "Hitting the Ethanol Blend Wall – Examining the Science on E15."

B. Matters for which Dr. Sahu has provided affidavits and expert reports include:

2. Affidavit for Rocky Mountain Steel Mills, Inc. located in Pueblo Colorado – dealing with the technical uncertainties associated with night-time opacity measurements in general and at this steel mini-mill.
3. Expert reports and depositions (2/28/2002 and 3/1/2002; 12/2/2003 and 12/3/2003; 5/24/2004) on behalf of the United States in connection with the Ohio Edison NSR Cases. *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).
4. Expert reports and depositions (5/23/2002 and 5/24/2002) on behalf of the United States in connection with the Illinois Power NSR Case. *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).
5. Expert reports and depositions (11/25/2002 and 11/26/2002) on behalf of the United States in connection with the Duke Power NSR Case. *United States, et al. v. Duke Energy Corp.*, 1:00-CV-1262 (Middle District of North Carolina).
6. Expert reports and depositions (10/6/2004 and 10/7/2004; 7/10/2006) on behalf of the United States in connection with the American Electric Power NSR Cases. *United States, et al. v. American Electric Power Service Corp., et al.*, C2-99-1182, C2-99-1250 (Southern District of Ohio).
7. Affidavit (March 2005) on behalf of the Minnesota Center for Environmental Advocacy and others in the matter of the Application of Heron Lake BioEnergy LLC to construct and operate an ethanol production facility – submitted to the Minnesota Pollution Control Agency.
8. Expert Report and Deposition (10/31/2005 and 11/1/2005) on behalf of the United States in connection with the East Kentucky Power Cooperative NSR Case. *United States v. East Kentucky Power Cooperative, Inc.*, 5:04-cv-00034-KSF (Eastern District of Kentucky).
9. Affidavits and deposition on behalf of Basic Management Inc. (BMI) Companies in connection with the BMI vs. USA remediation cost recovery Case.
10. Expert Report on behalf of Penn Future and others in the Cambria Coke plant permit challenge in Pennsylvania.

11. Expert Report on behalf of the Appalachian Center for the Economy and the Environment and others in the Western Greenbrier permit challenge in West Virginia.

12. Expert Report, deposition (via telephone on January 26, 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) in the Thompson River Cogeneration LLC Permit No. 3175-04 challenge.

13. Expert Report and deposition (2/2/07) on behalf of the Texas Clean Air Cities Coalition at the Texas State Office of Administrative Hearings (SOAH) in the matter of the permit challenges to TXU Project Apollo's eight new proposed PRB-fired PC boilers located at seven TX sites.

14. Expert Testimony (July 2007) on behalf of the Izaak Walton League of America and others in connection with the acquisition of power by Xcel Energy from the proposed Gascoyne Power Plant – at the State of Minnesota, Office of Administrative Hearings for the Minnesota PUC (MPUC No. E002/CN-06-1518; OAH No. 12-2500-17857-2).

15. Affidavit (July 2007) Comments on the Big Cajun I Draft Permit on behalf of the Sierra Club – submitted to the Louisiana DEQ.

16. Expert Report and Deposition (12/13/2007) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case. *Plaintiffs v. Allegheny Energy Inc., et al.,* 2:05cv0885 (Western District of Pennsylvania).

17. Expert Reports and Pre-filed Testimony before the Utah Air Quality Board on behalf of Sierra Club in the Sevier Power Plant permit challenge.

18. Expert Report and Deposition (October 2007) on behalf of MTD Products Inc., in connection with *General Power Products, LLC v MTD Products Inc.*, 1:06 CVA 0143 (Southern District of Ohio, Western Division) .

19. Expert Report and Deposition (June 2008) on behalf of Sierra Club and others in the matter of permit challenges (Title V: 28.0801-29 and PSD: 28.0803-PSD) for the Big Stone II unit, proposed to be located near Milbank, South Dakota.

20. Expert Reports, Affidavit, and Deposition (August 15, 2008) on behalf of Earthjustice in the matter of air permit challenge (CT-4631) for the Basin Electric Dry Fork station, under construction near Gillette, Wyoming before the Environmental Quality Council of the State of Wyoming.

21. Affidavits (May 2010/June 2010 in the Office of Administrative Hearings))/Declaration and Expert Report (November 2009 in the Office of Administrative Hearings) on behalf of NRDC and the Southern Environmental Law Center in the matter of the air permit challenge for Duke Cliffside Unit 6. Office of Administrative Hearing Matters 08 EHR 0771, 0835 and 0836 and 09 HER 3102, 3174, and 3176 (consolidated).

22. Declaration (August 2008), Expert Report (January 2009), and Declaration (May 2009) on behalf of Southern Alliance for Clean Energy in the matter of the air permit challenge for Duke Cliffside Unit 6. *Southern Alliance for Clean Energy et al., v. Duke Energy Carolinas, LLC*, Case No. 1:08-cv-00318-LHT-DLH (Western District of North Carolina, Asheville Division).

23. Declaration (August 2008) on behalf of the Sierra Club in the matter of Dominion Wise County plant MACT.us

24. Expert Report (June 2008) on behalf of Sierra Club for the Green Energy Resource Recovery Project, MACT Analysis.

25. Expert Report (February 2009) on behalf of Sierra Club and the Environmental Integrity Project in the matter of the air permit challenge for NRG Limestone's proposed Unit 3 in Texas.

26. Expert Report (June 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

27. Expert Report (August 2009) on behalf of Sierra Club and the Southern Environmental Law Center in the matter of the air permit challenge for Santee Cooper's proposed Pee Dee plant in South Carolina).

28. Statements (May 2008 and September 2009) on behalf of the Minnesota Center for Environmental Advocacy to the Minnesota Pollution Control Agency in the matter of the Minnesota Haze State Implementation Plans.

29. Expert Report (August 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

30. Expert Report and Rebuttal Report (September 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

31. Expert Report (December 2009) and Rebuttal reports (May 2010 and June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

32. Pre-filed Testimony (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

33. Pre-filed Testimony (July 2010) and Written Rebuttal Testimony (August 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

34. Expert Report (August 2010) and Rebuttal Expert Report (October 2010) on behalf of the United States in connection with the Louisiana Generating NSR

Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Liability Phase.

35. Declaration (August 2010), Reply Declaration (November 2010), Expert Report (April 2011), Supplemental and Rebuttal Expert Report (July 2011) on behalf of the United States in the matter of DTE Energy Company and Detroit Edison Company (Monroe Unit 2). *United States of America v. DTE Energy Company and Detroit Edison Company*, Civil Action No. 2:10-cv-13101-BAF-RSW (Eastern District of Michigan).

36. Expert Report and Deposition (August 2010) as well as Affidavit (September 2010) on behalf of Kentucky Waterways Alliance, Sierra Club, and Valley Watch in the matter of challenges to the NPDES permit issued for the Trimble County power plant by the Kentucky Energy and Environment Cabinet to Louisville Gas and Electric, File No. DOW-41106-047.

37. Expert Report (August 2010), Rebuttal Expert Report (September 2010), Supplemental Expert Report (September 2011), and Declaration (November 2011) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (District of Colorado).

38. Written Direct Expert Testimony (August 2010) and Affidavit (February 2012) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

39. Deposition (August 2010) on behalf of Environmental Defense, in the matter of the remanded permit challenge to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

40. Expert Report, Supplemental/Rebuttal Expert Report, and Declarations (October 2010, November 2010, September 2012) on behalf of New Mexico Environment Department (Plaintiff-Intervenor), Grand Canyon Trust and Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. Public Service Company of New Mexico* (PNM), Civil No. 1:02-CV-0552 BB/ATC (ACE) (District of New Mexico).

41. Expert Report (October 2010) and Rebuttal Expert Report (November 2010) (BART Determinations for PSCo Hayden and CSU Martin Drake units) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

42. Expert Report (November 2010) (BART Determinations for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

43. Declaration (November 2010) on behalf of the Sierra Club in connection with the Martin Lake Station Units 1, 2, and 3. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Case No. 5:10-cv-00156-DF-CMC (Eastern District of Texas, Texarkana Division).

44. Pre-Filed Testimony (January 2011) and Declaration (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

45. Declaration (February 2011) in the matter of the Draft Title V Permit for RRI Energy MidAtlantic Power Holdings LLC Shawville Generating Station (Pennsylvania), ID No. 17-00001 on behalf of the Sierra Club.

46. Expert Report (March 2011), Rebuttal Expert Report (June 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

47. Declaration (April 2011) and Expert Report (July 16, 2012) in the matter of the Lower Colorado River Authority (LCRA)'s Fayette (Sam Seymour) Power Plant on behalf of the Texas Campaign for the Environment. *Texas Campaign for the Environment v. Lower Colorado River Authority,* Civil Action No. 4:11-cv-00791 (Southern District of Texas, Houston Division).

48. Declaration (June 2011) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

49. Expert Report (June 2011) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

50. Declaration (August 2011) in the matter of the Sandy Creek Energy Associates L.P. Sandy Creek Power Plant on behalf of Sierra Club and Public Citizen. *Sierra Club, Inc. and Public Citizen, Inc. v. Sandy Creek Energy Associates, L.P.,* Civil Action No. A-08-CA-648-LY (Western District of Texas, Austin Division).

51. Expert Report (October 2011) on behalf of the Defendants in the matter of *John Quiles and Jeanette Quiles et al. v. Bradford-White Corporation, MTD Products, Inc., Kohler Co., et al.,* Case No. 3:10-cv-747 (TJM/DEP) (Northern District of New York).

52. Declaration (October 2011) on behalf of the Plaintiffs in the matter of *American Nurses Association et. al. (Plaintiffs), v. US EPA (Defendant)*, Case No. 1:08-cv-02198-RMC (US District Court for the District of Columbia).

53. Declaration (February 2012) and Second Declaration (February 2012) in the matter of *Washington Environmental Council and Sierra Club Washington State Chapter v. Washington State Department of Ecology and Western States Petroleum Association,* Case No. 11-417-MJP (Western District of Washington).

54. Expert Report (March 2012) and Supplemental Expert Report (November 2013) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v.*

ExxonMobil Corporation et al., Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

55. Declaration (March 2012) in the matter of *Center for Biological Diversity, et al. v. United States Environmental Protection Agency,* Case No. 11-1101 (consolidated with 11-1285, 11-1328 and 11-1336) (US Court of Appeals for the District of Columbia Circuit).

56. Declaration (March 2012) in the matter of *Sierra Club v. The Kansas Department of Health and Environment*, Case No. 11-105,493-AS (Holcomb power plant) (Supreme Court of the State of Kansas).

57. Declaration (March 2012) in the matter of the Las Brisas Energy Center *Environmental Defense Fund et al., v. Texas Commission on Environmental Quality,* Cause No. D-1-GN-11-001364 (District Court of Travis County, Texas, 261st Judicial District).

58. Expert Report (April 2012), Supplemental and Rebuttal Expert Report (July 2012), and Supplemental Rebuttal Expert Report (August 2012) on behalf of the states of New Jersey and Connecticut in the matter of the Portland Power plant *State of New Jersey and State of Connecticut (Intervenor-Plaintiff) v. RRI Energy Mid-Atlantic Power Holdings et al.,* Civil Action No. 07-CV-5298 (JKG) (Eastern District of Pennsylvania).

59. Declaration (April 2012) in the matter of the EPA's EGU MATS Rule, on behalf of the Environmental Integrity Project.

60. Expert Report (August 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Harm Phase.

61. Declaration (September 2012) in the Matter of the Application of *Energy Answers Incinerator, Inc.* for a Certificate of Public Convenience and Necessity to Construct a 120 MW Generating Facility in Baltimore City, Maryland, before the Public Service Commission of Maryland, Case No. 9199.

62. Expert Report (October 2012) on behalf of the Appellants (Robert Concilus and Leah Humes) in the matter of Robert Concilus and Leah Humes v. Commonwealth of Pennsylvania Department of Environmental Protection and Crawford Renewable Energy, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2011-167-R.

63. Expert Report (October 2012), Supplemental Expert Report (January 2013), and Affidavit (June 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

64. Pre-filed Testimony (October 2012) on behalf of No-Sag in the matter of the North Springfield Sustainable Energy Project before the State of Vermont, Public Service Board.

65. Pre-filed Testimony (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to

Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

66. Expert Report (February 2013) on behalf of Petitioners in the matter of Credence Crematory, Cause No. 12-A-J-4538 before the Indiana Office of Environmental Adjudication.

67. Expert Report (April 2013), Rebuttal report (July 2013), and Declarations (October 2013, November 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

68. Declaration (April 2013) on behalf of Petitioners in the matter of *Sierra Club, et al., (Petitioners) v Environmental Protection Agency et al. (Resppondents),* Case No., 13-1112, (Court of Appeals, District of Columbia Circuit).

69. Expert Report (May 2013) and Rebuttal Expert Report (July 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

70. Declaration (August 2013) on behalf of A. J. Acosta Company, Inc., in the matter of *A. J. Acosta Company, Inc., v. County of San Bernardino*, Case No. CIVSS803651.

71. Comments (October 2013) on behalf of the Washington Environmental Council and the Sierra Club in the matter of the Washington State Oil Refinery RACT (for Greenhouse Gases), submitted to the Washington State Department of Ecology, the Northwest Clean Air Agency, and the Puget Sound Clean Air Agency.

72. Statement (November 2013) on behalf of various Environmental Organizations in the matter of the Boswell Energy Center (BEC) Unit 4 Environmental Retrofit Project, to the Minnesota Public Utilities Commission, Docket No. E-015/M-12-920.

73. Expert Report (December 2013) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

74. Expert Testimony (December 2013) on behalf of the Sierra Club in the matter of Public Service Company of New Hampshire Merrimack Station Scrubber Project and Cost Recovery, Docket No. DE 11-250, to the State of New Hampshire Public Utilities Commission.

75. Expert Report (January 2014) on behalf of Baja, Inc., in *Baja, Inc., v. Automotive Testing and Development Services, Inc. et. al*, Civil Action No. 8:13-CV-02057-GRA (District of South Carolina, Anderson/Greenwood Division).

76. Declaration (March 2014) on behalf of the Center for International Environmental Law, Chesapeake Climate Action Network, Friends of the Earth, Pacific

Environment, and the Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. the Export-Import Bank (Ex-Im Bank) of the United States*, Civil Action No. 13-1820 RC (District Court for the District of Columbia).

77. Declaration (April 2014) on behalf of Respondent-Intervenors in the matter of *Mexichem Specialty Resins Inc., et al., (Petitioners) v Environmental Protection Agency et al.,* Case No., 12-1260 (and Consolidated Case Nos. 12-1263, 12-1265, 12-1266, and 12-1267), (Court of Appeals, District of Columbia Circuit).

78. Direct Prefiled Testimony (June 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17319 (Michigan Public Service Commission).

79. Expert Report (June 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).

80. Direct Prefiled Testimony (August 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of Consumers Energy Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17317 (Michigan Public Service Commission).

81. Declaration (July 2014) on behalf of Public Health Intervenors in the matter of *EME Homer City Generation v. US EPA* (Case No. 11-1302 and consolidated cases) relating to the lifting of the stay entered by the Court on December 30, 2011 (US Court of Appeals for the District of Columbia).

82. Expert Report (September 2014), Rebuttal Expert Report (December 2014) and Supplemental Expert Report (March 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

83. Expert Report (November 2014) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

84. *Declaration (January 2015) relating to Startup/Shutdown in the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.*

85. Pre-filed Direct Testimony (March 2015), Supplemental Testimony (May 2015), and Surrebuttal Testimony (December 2015) on behalf of Friends of the Columbia Gorge in the matter of the Application for a Site Certificate for the Troutdale Energy Center before the Oregon Energy Facility Siting Council.

86. Brief of Amici Curiae Experts in Air Pollution Control and Air Quality Regulation in Support of the Respondents, On Writs of Certiorari to the US Court of Appeals for the District of Columbia, No. 14-46, 47, 48. *Michigan et. al., (Petitioners) v. EPA et. al., Utility Air Regulatory Group (Petitioners) v. EPA et. al., National Mining Association et. al., (Petitioner) v. EPA et. al.,* (Supreme Court of the United States).

87. Expert Report (March 2015) and Rebuttal Expert Report (January 2016) on behalf of Plaintiffs in the matter of *Conservation Law Foundation v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

88. Declaration (April 2015) relating to various Technical Corrections for the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.

89. Direct Prefiled Testimony (May 2015) on behalf of the Michigan Environmental Council, the Natural Resources Defense Council, and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Increase its Rates, Amend its Rate Schedules and Rules Governing the Distribution and Supply of Electric Energy and for Miscellaneous Accounting Authority, Case No. U-17767 (Michigan Public Service Commission).

90. Expert Report (July 2015) and Rebuttal Expert Report (July 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

91. Declaration (August 2015, Docket No. 1570376) in support of "Opposition of Respondent-Intervenors American Lung Association, et. al., to Tri-State Generation's Emergency Motion;" Declaration (September 2015, Docket No. 1574820) in support of "Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors for Remand Without Vacatur;" Declaration (October 2015) in support of "Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors to State and Certain Industry Petitioners' Motion to Govern, *White Stallion Energy Center, LLC v. US EPA*, Case No. 12-1100 (US Court of Appeals for the District of Columbia).

92. Declaration (September 2015) in support of the Draft Title V Permit for Dickerson Generating Station (Proposed Permit No 24-031-0019) on behalf of the Environmental Integrity Project.

93. Expert Report (Liability Phase) (December 2015) and Rebuttal Expert Report (February 2016) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., Environmental Law and Policy Center, and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).

94. Declaration (December 2015) in support of the Petition to Object to the Title V Permit for Morgantown Generating Station (Proposed Permit No 24-017-0014) on behalf of the Environmental Integrity Project.

95. Expert Report (November 2015) on behalf of Appellants in the matter of *Sierra Club, et al. v. Craig W. Butler, Director of Ohio Environmental Protection Agency et al.*, ERAC Case No. 14-256814.

96. Affidavit (January 2016) on behalf of Bridgewatch Detroit in the matter of *Bridgewatch Detroit v. Waterfront Petroleum Terminal Co., and Waterfront Terminal Holdings, LLC.*, in the Circuit Court for the County of Wayne, State of Michigan.

97. Expert Report (February 2016) and Rebuttal Expert Report (July 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.

98. Direct Testimony (May 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.

99. Declaration (June 2016) relating to deficiencies in air quality analysis for the proposed Millenium Bulk Terminal, Port of Longview, Washington.

100. Declaration (December 2016) relating to EPA's refusal to set limits on PM emissions from coal-fired power plants that reflect pollution reductions achievable with fabric filters on behalf of Environmental Integrity Project, Clean Air Council, Chesapeake Climate Action Network, Downwinders at Risk represented by Earthjustice in the matter of *ARIPPA v EPA, Case No. 15-1180.* (D.C. Circuit Court of Appeals).

101. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

102. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Backus Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

103. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Drakulic Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

104. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Deutsch Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

105. Affidavit (February 2017) pertaining to deficiencies water discharge compliance issues at the Wood River Refinery in the matter of *People of the State of Illinois (Plaintiff) v. Phillips 66 Company, ConocoPhillips Company, WRB Refining LP (Defendants)*, Case No. 16-CH-656, (Circuit Court for the Third Judicial Circuit, Madison County, Illinois).

106. Expert Report (March 2017) on behalf of the Plaintiff pertaining to non-degradation analysis for waste water discharges from a power plant in the matter of *Sierra Club (Plaintiff) v. Pennsylvania Department of Environmental Protection (PADEP) and Lackawanna Energy Center*, Docket No. 2016-047-L (consolidated), (Pennsylvania Environmental Hearing Board).

107. Expert Report (March 2017) on behalf of the Plaintiff pertaining to air emissions from the Heritage incinerator in East Liverpool, Ohio in the matter of *Save our County (Plaintiff) v. Heritage Thermal Services, Inc. (Defendant), Case No. 4:16-CV-1544-BYP*, (US District Court for the Northern District of Ohio, Eastern Division).

108. Rebuttal Expert Report (June 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight (Plaintiffs) v Coyote Creek Mining Company LLC (Defendant),* Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).

109. Expert Affidavit (August 2017) and Penalty/Remedy Expert Affidavit (October 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant,)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).

110. Expert Report (August 2017) on behalf of Appellant in the matter of *Patricia Ann Troiano (Appellant) v. Upper Burrell Township Zoning Hearing Board (Appellee)*, Court of Common Pleas of Westmoreland County, Pennsylvania, Civil Division.

111. Expert Report (October 2017), Supplemental Expert Report (October 2017), and Rebuttal Expert Report (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

112. Declaration (December 2017) on behalf of the Environmental Integrity Project in the matter of permit issuance for ATI Flat Rolled Products Holdings, Breckenridge, PA to the Allegheny County Health Department.

113. Expert Report (Harm Phase) (January 2018) and Rebuttal Expert Report (Harm Phase) (May 2018) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).

114. Declaration (February 2018) on behalf of the Chesapeake Bay Foundation, et. al., in the matter of the Section 126 Petition filed by the state of Maryland in *State of*

Maryland v. Pruitt (Defendant), Civil Action No. JKB-17-2939 (Consolidated with No. JKB-17-2873) (US District Court for the District of Maryland).

115. Direct Pre-filed Testimony (March 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of *NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC*, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington.

116. Expert Affidavit (April 2018) and Second Expert Affidavit (May 2018) on behalf of Petitioners in the matter of *Coosa River Basin Initiative and Sierra Club (Petitioners) v State of Georgia Environmental Protection Division, Georgia Department of Natural Resources (Respondent) and Georgia Power Company (Intervenor/Respondent)*, Docket Nos: 1825406-BNR-WW-57-Howells and 1826761-BNR-WW-57-Howells, Office of State Administrative Hearings, State of Georgia.

C. Occasions where Dr. Sahu has provided oral testimony in depositions, at trial or in similar proceedings include the following:

117. Deposition on behalf of Rocky Mountain Steel Mills, Inc. located in Pueblo, Colorado – dealing with the manufacture of steel in mini-mills including methods of air pollution control and BACT in steel mini-mills and opacity issues at this steel mini-mill.

118. Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.

119. Trial Testimony (February 2003) on behalf of the United States in the Ohio Edison NSR Cases, *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).

120. Trial Testimony (June 2003) on behalf of the United States in the Illinois Power NSR Case, *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).

121. Deposition (10/20/2005) on behalf of the United States in connection with the Cinergy NSR Case. *United States, et* al. *v. Cinergy Corp., et al.*, IP 99-1693-C-M/S (Southern District of Indiana).

122. Oral Testimony (August 2006) on behalf of the Appalachian Center for the Economy and the Environment re. the Western Greenbrier plant, WV before the West Virginia DEP.

123. Oral Testimony (May 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) re. the Thompson River Cogeneration plant before the Montana Board of Environmental Review.

124. Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.

125. Oral Testimony (August 2008) on behalf of the Sierra Club and Clean Water re. Big Stone Unit II before the South Dakota Board of Minerals and the Environment.

126. Oral Testimony (February 2009) on behalf of the Sierra Club and the Southern Environmental Law Center re. Santee Cooper Pee Dee units before the South Carolina Board of Health and Environmental Control.

127. Oral Testimony (February 2009) on behalf of the Sierra Club and the Environmental Integrity Project re. NRG Limestone Unit 3 before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

128. Deposition (July 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

129. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coleto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

130. Deposition (October 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

131. Deposition (October 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

132. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Tenaska coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH). (April 2010).

133. Oral Testimony (November 2009) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

134. Deposition (December 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

135. Oral Testimony (February 2010) on behalf of the Environmental Defense Fund re. the White Stallion Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

136. Deposition (June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

137. Trial Testimony (September 2010) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, State of Maryland, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case in US District Court in the Western District of Pennsylvania. *Plaintiffs v. Allegheny Energy Inc., et al.,* 2:05cv0885 (Western District of Pennsylvania).

138. Oral Direct and Rebuttal Testimony (September 2010) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

139. Oral Testimony (September 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

140. Oral Testimony (October 2010) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

141. Oral Testimony (November 2010) regarding BART for PSCo Hayden, CSU Martin Drake units before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

142. Oral Testimony (December 2010) regarding BART for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

143. Deposition (December 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

144. Deposition (February 2011 and January 2012) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (D. Colo.).

145. Oral Testimony (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

146. Deposition (August 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

147. Deposition (July 2011) and Oral Testimony at Hearing (February 2012) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

148. Oral Testimony at Hearing (March 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

149. Oral Testimony at Hearing (April 2012) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the

Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

150. Oral Testimony at Hearing (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

151. Deposition (March 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

152. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

153. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

154. Deposition (February 2014) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

155. Trial Testimony (February 2014) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.*, Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

156. Trial Testimony (February 2014) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

157. Deposition (June 2014) and Trial (August 2014) on behalf of ECM Biofilms in the matter of the *US Federal Trade Commission (FTC) v. ECM Biofilms* (FTC Docket #9358).

158. Deposition (February 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

159. Oral Testimony at Hearing (April 2015) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

160. Deposition (August 2015) on behalf of Plaintiff in the matter of *Conservation Law Foundation (Plaintiff) v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

161. Testimony at Hearing (August 2015) on behalf of the Sierra Club in the matter of *Amendments to 35 Illinois Administrative Code Parts 214, 217, and 225* before the Illinois Pollution Control Board, R15-21.

162. Deposition (May 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

163. Trial Testimony (October 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

164. Deposition (April 2016) on behalf of the Plaintiffs in *UNatural Resources Defense Council, Respiratory Health Association, and Sierra Club (Plaintiffs) v. Illinois Power Resources LLC and Illinois Power Resources Generation LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (Central District of Illinois, Peoria Division).

165. Trial Testimony at Hearing (July 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.

166. Trial Testimony (December 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.

167. Trial Testimony (July-August 2016) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

168. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

169. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Backus Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

170. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Drakulic Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

171. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Deutsch Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

172. Deposition Testimony (July 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight v Coyote Creek Mining Company LLC (Defendant)* Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).

173. Deposition Testimony (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

174. Deposition Testimony (December 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).

175. Deposition Testimony (January 2018) in the matter of National Parks Conservation Association (NPCA) v. State of Washington Department of Ecology and British Petroleum (BP) before the Washington Pollution Control Hearing Board, Case No. 17-055.

176. Trial Testimony (January 2018) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

177. Trial Testimony (April 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington.

APPENDIX C

PUGET SOUND ENERGY
The Energy To Do Great Things
Puget Sound Energy
P.O. Box 97034
Bellevue, WA 98009-9734
PSE.com

July 11, 2016

VIA HAND DELIVERY

Shirley Schultz, Principal Planner
Planning and Development Services Department
City of Tacoma
747 Market Street, Room 345
Tacoma, WA 98402

RE: Tacoma LNG FEIS; Inquiry re Updating

Dear Ms. Schultz:

Puget Sound Energy (PSE) understands that the City of Tacoma received a request on June 15, 2016 via email (3:44 p.m., Claudia Riedener at ixia@harbornet.com) that the City prepare a supplement to the Final Environmental Impact Statement (FEIS) regarding Tacoma LNG. PSE respectfully submits that it is not appropriate for the FEIS to be supplemented.

PSE proposes the construction of a liquefied natural gas (LNG) facility that would liquefy and store natural gas for use as a marine vessel fuel and to provide natural gas for peak shaving to meet increases in regional demand for natural gas. The switch by marine vessels from bunker fuel to LNG will have immediate environmental benefits for Puget Sound by reducing greenhouse gases, sulfur dioxide and particulate emissions, health risks associated with the combustion of diesel fuel and the risk of potentially damaging fuel spills.

The Project was originally comprised of three elements: 1) an upland LNG processing facility, 2) a barge fueling (bunkering) facility on the Hylebos, and 3) a TOTE LNG Fueling Facility on the Blair.

Marine vessels conventionally receive fuel (a process known as "bunkering") from fuel barges (aka "bunker barges") that deliver the fuel to the ship while it is moored at a berth or anchored in harbor. This fuel transfer most often occurs at a "bunker station" which is a hose connection usually on the side of the ship.
The Hylebos Waterway bunkering facility PSE had initially proposed as part of Tacoma LNG was envisioned as a means to transfer LNG from the Tacoma LNG plant into a LNG bunker barge. The bunker barge would then deliver LNG for use as a fuel to ships in the Port of Tacoma or Seattle (assuming that market ever emerged – none exists today).
Unlike conventional marine vessel fueling, TOTE's two ORCA-class vessels that are being converted to run on LNG will be fueled with LNG via a bunker station that is located high and

on the stem of the ship between the mooring lines. As a result of this unique configuration, the TOTE Fueling Facility element of the Project, on the Blair Waterway, has been specifically designed to reach out and over the mooring lines to connect to the aft bunker station on the TOTE vessels at a significant height above the water.

An LNG bunker barge of conventional dimensions would not be capable of receiving LNG from the TOTE loading arm because it is only designed to reach and deliver LNG to the unique geometry of the TOTE vessel bunker location. Additionally, there are no barge mooring provisions at the TOTE Fueling Facility that would accommodate a bunker barge.

The City published a final Environmental Impact Statement (FEIS) under SEPA for Tacoma LNG in November 2015. The FIS evaluated the proposed facility for potential adverse environmental impacts from the Project's various constituent elements, including those described above.

In January 2016, PSE eliminated the Hylebos bunker barge element from the original proposal. The operations that would have resulted from the bunkering facility have not been relocated to the Blair, because the TOTE Fueling Facility is not configured to fuel bunker barges. The Shoreline Substantial Development Permit issued for Tacoma LNG does not allow for such a shifting of bunker barge facility construction or operations to the Blair Waterway. Moreover, no changes have been made to the configuration of the TOTE Fueling Facility to accommodate barges that would transport LNG to other vessels. Notably, the TOTE Fueling Facility is not configured to fuel tanker trucks, no changes to accommodate this are proposed, and PSE will not fuel LNG tanker trucks from the TOTE Fueling Facility. TOTE's fuel demands from PSE are unchanged by the elimination of the Hylebos element of the Project; therefore, the size and capacity of the pipeline to TOTE Fueling Facility remain unchanged. The impacts to the Blair Waterway from the TOTE Fueling Facility remain the same today as those examined in the FEIS. The Project today is simply smaller in scope, with fewer but no new or changed impacts.

Information about removal of the Hylebos aspect of the Project has been broadly disseminated since January of 2016. PSE memorialized this reduction in the scope by entry of a Stipulation with the State of Washington's Shoreline Hearings Board (SHB) on January 28, 2016. A copy of this Stipulation (attached hereto) was provided to the City contemporaneously with its entry at the SHB. All other agencies with jurisdiction to issue Tacoma LNG permits were similarly advised. The fact of this reduction in scope and impacts has also been placed in the public record in various legal proceedings before the SHB and Pierce County Superior Court.

A Supplemental EIS (SEIS) is required when substantial changes to a proposal or new information indicate probable significant adverse environmental impacts that were not adequately covered by the range of impacts analyzed in the FEIS. See WAC 197-11-405(4), -600(3)(b), (4)(d). Neither of these events occurred here. The activities dropped from the Project as a result of the Stipulation have not been moved to the Blair Waterway, and tanker truck

loading from the TOTE Fueling Facility will not, and cannot, occur due to the unique configuration of the Facility, regardless of whether the Hylebos element exists or not. The impacts that will result from work and operations in the Blair were studied in the FEIS, and nothing (including configuration, usage or volumes) has changed regarding that element since the FEIS was published.

To summarize, eliminating the in-water work and bunkering operations from the Hylebos simply reduces the impacts from the Project. Such elimination, without replacement or relocation on the Blair, does not create anything new or different for the City to review.

Nonetheless, the requests for supplementation are based on the following statements:

> "This new information [elimination of construction and bunkering operations on Hylebos] and development amounts to a substantial change to the EIS, since the LNG delivery would have to increase via:
>
> 1) Additional truck loading and transportation of the LNG (currently stated at two trucks per day)
> 2) Additional ship docking/loading on the Blair Pier, described as only being used by TOTE.
>
> The risk assessments for both Blair Pier and road trucking would be substantially different with increased traffic at either or at both and would significantly impact the EIS.
>
> 1) We urge you issue a supplemental EIS to clarify additional road loading at the facility and trucking in the Port of Tacoma and the region due to increased risks at loading, increased traffic, increased environmental impacts, increased noise impacts and increased risk to others on the road.
> 2) We urge you issue a supplemental EIS to re-evaluate the Blair TOTE Pier risk analysis, including increased LNG through LNG pipeline extending outside PSE property as well as increased LNG loading at the pier and increased transport through the Blair Waterway and the Puget Sound waterway area."

These conclusions are incorrect, as explained above. No trucks will fuel at the TOTE Fueling Facility on the Blair Waterway as a result of the removal of the Hylebos operations. TOTE's fuel supply demand remains unchanged, and the volume of LNG delivered via pipeline to the TOTE LNG Fueling Facility will not increase as a result. No other ships will dock and load at the TOTE Fueling Facility as a result of removal of the Hylebos operations. The TOTE Fueling Facility is not being converted into a bunker barge facility as a result of the elimination of the Hylebos element of the project.

Consequently, there is no substantial change to, or new information about, the Project that will cause 'additional road loading at the facility and trucking in the Port of Tacoma and the region'

that would give rise to the potential for 'increased risks at loading, increased traffic, increased environmental impacts, increased noise impacts and increased risk to others on the road' that require supplementation of the FEIS.

Likewise, the reduction of the Project scope is not new information or a substantial change that could cause previously unstudied impacts. The lack of new or changed impacts leaves the adequacy of the FEIS untouched. There is no legal or factual basis under SEPA to 'to re-evaluate the Blair TOTE Pier risk analysis, including increased LNG through LNG pipeline extending outside PSE property as well as increased LNG loading at the pier and increased transport through the Blair Waterway and the Puget Sound waterway area'.

There have been no substantial changes or new information that would change the SEPA analysis conducted by the City of Tacoma. The EIS is not deficient, and no supplementation is required.

PSE welcomes any questions you may have about the foregoing.

Very truly yours,

PUGET SOUND ENERGY

Larry Tornberg

Larry Tornberg
Senior Siting Project Manager

Cc: T.C. Broadnax
Peter Huffman
Jeff Cappell
Lorna Luebbe
Jim Hogan
Erin Anderson

City of Tacoma
Planning and Development Services

July 14, 2016

Larry Tornberg
Puget Sound Energy
PO Box 97034 EST 08E
Bellevue, WA 98009-9734

VIA REGULAR and ELECTRONIC MAIL

Subject: Tacoma LNG FEIS - Inquiry re Updating

Dear Mr. Tornberg:

Thank you very much for your July 11 letter in response to questions the City has received regarding changes to the proposal for the LNG facility at 1001 Alexander Avenue (PSE site) and 3115 East 11th Street (TOTE site). Your response and clarification of the reduction in scale of the proposal is very helpful and we will be able to use it in further conversations with both the public and other reviewing agencies.

I have reviewed your letter with Peter Huffman, the City's SEPA Official, and there are a few follow-up items that need to be addressed.

First, your letter answers very well the question of trucks fueling at the TOTE Site. However, the proposal still includes truck racks at the PSE Site. Please confirm that the removal of the Hylebos bunkering facility in the proposal will not result in an increase in trucking from the PSE Site.

Second, if you can, please describe in more detail what changes would be required at the TOTE site to allow fueling other ships or bunkering barges. Are there other ships which could be fueled using the same configuration that TOTE would be using? TOTE has permits for barge moorage at their site to allow for fueling; could the fueling arm that PSE will build be used to fill barges? What kind of permitting/agency review do you anticipate would be required for such changes to take place?

Finally, please clarify (in very simple terms): will the removal of the Hylebos bunkering operation mean that PSE would just liquefy less gas? Would this mean that, rather than operating at fullest capacity and distributing the product by truck or by bunkering or direct-ship fueling, the production levels at the liquefaction facility would be lower?

Please be aware that we may need additional information depending on the outcome of the Shorelines Hearings Board decision. Further, should there be a change in the number of LNG trucks entering or leaving either the PSE site or the TOTE site from that analyzed in the EIS, that will need to be addressed.

747 Market Street, Suite 345 | Tacoma, Washington 98402 | Fax (253)591-5433
Phone (253) 591-5030 | http://www.tacomapermits.org

Once again, thank you for your continued communication regarding this project.

Sincerely,

Shirley Schultz
Principal Planner

Cc (via electronic mail only):
T.C. Broadnax, City Manager
Peter Huffman, Director, Planning and Development Services
Jeff Cappell, Deputy City Attorney
Lorna Luebbe, Puget Sound Energy
Jim Hogan, Puget Sound Energy
Erin Anderson, Stoel Rives

PUGET SOUND ENERGY

Puget Sound Energy
P.O. Box 97034
Bellevue, WA 98009-9734
PSE.com

July 25, 2016

VIA First Class U.S. Mail and Electronic Delivery

Shirley Schultz
Principal Planner
City of Tacoma
747 Market Street, Suite 345
Tacoma, WA 98402

Re: **Response to City of Tacoma's July 14, 2016 Request to Update Information Re Tacoma LNG FEIS**

Dear Ms. Schultz:

This letter responds to your July 14, 2016 request for additional information on Puget Sound Energy, Inc.'s Tacoma Liquefied Natural Gas Facility ("Tacoma LNG Facility"). For clarity, the letter is organized by each question raised by the City of Tacoma ("City").

1) **Will there be an increase in trucking from the PSE Site due to the removal of the Hylebos bunkering facility? Does the presence of truck racks indicate a change in truck traffic?** No and No. Removal of the Hylebos bunkering facility is not expected to significantly increase truck traffic from the levels analyzed in the EIS. Additionally, as explained in the EIS, any traffic from the LNG Facility is unlikely to rise to the level of significance in light of baseline traffic conditions in the Port of Tacoma. *See* FEIS, Table 3.10-1.

   Construction traffic for the Tacoma LNG Facility was estimated to include 185 vehicles per day. *See* FEIS, Table 3.10-3 at pg. 3.10-12. Operational traffic was estimated to be 60 vehicles per day (including up to 14 LNG Tanker trucks per week). FEIS at 3.10-15. Loading an LNG Tanker requires truck racks. The FEIS concludes that, with mitigation measures identified in the FEIS (*e.g.*, PSE contribution to reconstruction of Taylor Way), the Project will have no significant unavoidable adverse impacts. The current traffic levels into and out of the Port of Tacoma was a significant factor in reaching this conclusion. FEIS at 3.10-15 (noting that "compared to daily traffic volumes on roadways, the addition of 60 vehicles would be insignificant).

2) **What changes would be required at the TOTE Site to allow for the fueling of other ships or bunkering barges? Could the TOTE Fueling Facility be used to fuel non-TOTE marine vessels? Bunker barges?** The specific loading arm designed for the TOTE Site is configured solely to fuel TOTE vessels and lacks components required to fuel other ships or barges. Unlike conventional marine vessel fueling, TOTE's two ORCA-class vessels will be fueled with LNG high above the ship's stern. Conventionally-designed marine vessels and bunker barges would not be capable of receiving LNG from the TOTE loading arm because it is only designed to deliver LNG to the unique geometry of the TOTE vessels. PSE is not aware of any other existing marine vessel or bunker barge with this fuel loading configuration. Moreover, PSE is not aware of existing demand beyond TOTE for LNG to fuel marine vessels or load bunker barges. PSE has no development plans to fuel non-TOTE ships or bunkering barges at the TOTE Fueling Facility.

   In sum, at this time, PSE believes that significant new facilities would have to be designed, permitted and built to accommodate fueling non-TOTE marine vessels or barges at the TOTE Fueling Facility. Additionally, a new market for LNG for marine vessels would have to develop before PSE undertook any such action.

3) **What kind of permitting/agency review would PSE anticipate for changes required to fuel marine vessels or load LNG onto bunker barges?** Any analysis of permit requirements at this time would be entirely speculative. If, at some future date, an LNG market for marine vessels were to emerge and PSE decided to participate in it, PSE would engage the City of Tacoma early in its design process and would dutifully pursue full compliance with all applicable local, state and federal permitting requirements.

4) **Does the removal of the Hylebos bunkering operation mean that PSE would liquefy less gas than originally estimated in the FEIS? Would production levels at the liquefaction facility be lower?** The Tacoma LNG Facility production levels are unknown at this time, but will depend on market demand for LNG when the facility becomes operational. The Tacoma LNG Facility's planned capacity is 250,000 gallons of LNG per day. PSE anticipates that LNG production will be within the range analyzed in the EIS.

Please let us know if there is any additional information that PSE can provide to assist you in your continued oversight over the proposed Tacoma LNG Facility.

Best regards,

Larry Tornberg

Larry Tornberg
Senior Siting Project Manager

Cc:

Roger Garratt, Puget Sound Energy
Lorna Luebbe, Puget Sound Energy
Jim Hogan, Puget Sound Energy
Jeff Capell, Deputy City Attorney
Erin Anderson, Stoel Rives, LLP
Sara Leverette, Stoel Rives, LLP

APPENDIX D

U.S. Department of Homeland Security
United States Coast Guard

16711
October 31, 2016

Totem Ocean Trailer Express, Inc.
Attn: Peter Keller
Executive Vice President
14 Nassau Street
Princeton, NJ 08540

MARPOL ANNEX VI, REGULATION 3 EXEMPTION PERMIT

Dear Mr. Keller:

By this letter, the United States Government (USG) is notifying Totem Ocean Trailer Express (TOTE) that effective 30 days from the date of this letter, the permit dated November 5, 2014 issued by the USG to TOTE exempting the MIDNIGHT SUN (IMO 9232278) and the NORTH STAR (IMO 9232280) from the requirements of MARPOL Annex VI regulation 14.4 is revoked.

In 2012, TOTE requested and the USG granted a permit under Regulation 3 of MARPOL Annex VI to allow TOTE to conduct trials for the development of ship emission reduction and control technologies onboard two ships, the MIDNIGHT SUN and the NORTH STAR. The research project consisted of 1) developing and retrofitting advanced liquefied natural gas (LNG) conversion kits and fuel system modifications for each of six marine diesel engines installed on each of the Vessels that operate between Tacoma, WA, and Anchorage, Alaska; 2) assisting in the development of LNG refueling facilities and procedures for the Vessels in the Puget Sound region; and 3) assisting in the development of alternative power generation and use procedures for the Vessels in Anchorage, AK. Under the terms of the permit, the vessels would be fully converted by September 30, 2016, with some engines being converted in 2014, 2015, and 2016. During the permit, the ships would be exempted from complying with the North American ECA fuel sulfur requirements.

In 2013, TOTE informed USG that it was unable to comply with the terms of the permit because the conversion kits would not be available as planned (the engine manufacturer withdrew from the project). TOTE indicated it was revising the project and the four main engines on each vessel would be replaced with new dual-fuel engines. In 2014, TOTE requested and USG granted an extension to the permit specifying the first vessel would be converted for LNG use by March 31, 2016 and the second vessel by March 31, 2017. TOTE indicated that a smaller steamship, EL FARO, would be used as a temporary replacement while each ship, in turn, was removed from service for the conversion.

On or about October 2, 2015, the EL FARO was lost as sea with all hands after losing propulsion during Hurricane Joaquin. Due to this tragedy, TOTE requested another one-year delay in the schedule to allow refitting an alternative replacement ship, EL YUNQUE, for operation in cold weather conditions. During discussions for this extension, TOTE notified USG of yet another change in plans due to a decision to retire the EL YUNQUE for safety reasons. In this latest revision, the program would revert to development of conversion kits (the engine manufacturer is now indicating they will develop the kits). However, due to the need to take each vessel out of service for installation of at least part of the conversion kits, TOTE now does not expect that the first vessel to be converted to LNG until 2019 and the second vessel until 2020. This would extend the length of the exemption from the fuel sulfur standards by approximately three years from the existing permit (totaling more than seven years of exemption).

The net result of these delays is that, today, vessels continue to operate on higher sulfur fuel inside the North American ECA, and there has been little or no progress in installing LNG technology on the ships.

16711
October 31, 2016

MARPOL ANNEX VI, REGULATION3 EXEMPTION PERMIT

The permit includes a provision expressly addressing the possibility of termination of a permit, including revocation of the exemption from the MARPOL Annex VI fuel sulfur requirements. Specifically, section C.3 (a) states:

> "The USG may revoke or modify this permit if at any point TOTE is not compliant with MARPOL Annex VI, including but not limited to the Regulation 3 trial program requirements and conditions herein. The requirements of MARPOL Annex VI Regulation 14 shall apply as of the date of the noncompliance which forms the basis for the revocation."

Due to the extensive time period that has passed since the permit was originally issued, the lack of substantive progress in the application of LNG technology for these vessels, and the associated adverse impact on public health and the environment, it is in the public interest to terminate the permit effective 30 days from the date of this letter. As of that date, the USG will no longer recognize the exemptions and permit, and the ships will be required to comply with the MARPOL Annex VI Regulation 14.4 sulfur limits for fuel used in ships operating in the U.S. portion of the North American and U.S. Caribbean Sea designated ECAs.

Sincerely,

Rear Admiral Paul F. Thomas
Assistant Commandant for Prevention Policy
U.S. Coast Guard

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

APPENDIX E

BEFORE THE SHORELINE HEARINGS BOARD
STATE OF WASHINGTON

PUYALLUP TRIBE OF INDIANS, a Federally Recognized Indian Tribe, Petitioner, v. CITY OF TACOMA, a Municipal Corporation; PUGET SOUND ENERGY, INC., a Washington Corporation; PORT OF TACOMA; and WASHINGTON STATE DEPARTMENT OF ECOLOGY, Respondents.	SHB No. 16-002 PUGET SOUND ENERGY, INC.'S RESPONSE IN OPPOSITION TO PUYALLUP TRIBE'S DISPOSITIVE MOTION FOR REVERSAL AND REMAND OF SSDP SHR2015-40000246123

Puget Sound Energy, Inc. ("PSE") respectfully requests that the Puyallup Tribe's Dispositive Motion for Reversal and Remand of SSDP SHR2015-40000246123-5 ("Puyallup's Motion") be denied.[1] The motion rests almost entirely on the Tribe's speculation that: 1) PSE's binding Stipulation Restricting SSDP Re: In- and Over-water in Hylebos Waterway ("PSE's Voluntary Stipulation") reconfigures operations of the Tacoma Liquefied Natural Gas ("LNG") facility, and 2) PSE has some future plan for the Tacoma LNG Facility not analyzed during the City of Tacoma's ("City") review. The Tribe's speculation is unfounded and improper as a

[1] PSE incorporates by reference its Motion to Dismiss under CR 12(b)(1) and (6), and the Declaration of Erin Anderson ("Anderson Decl.") in support of the motion, with exhibits, filed in this appeal on March 4, 2016.

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matter of law. The Tribe does not argue that PSE's Voluntary Stipulation is ambiguous. Nor does the Tribe offer any competent evidence to suggest that PSE intends to circumvent the Stipulation. All claims based on the Tribe's improper speculation should be dismissed.

The Puyallup's Motion raises two issues not premised on their speculation, an improper delegation claim and an attack on the City's "no net loss" determination. The City has not improperly deferred and/or delegated its authority under the SMA to other permitting agencies, as a matter of law. Instead, it has acted appropriately in relation to other agencies with jurisdiction over shorelines and marine waters consistently with City SSDP issuance practices. Moreover, the Tribe's delegation argument ignores the scope of this Board's *de novo* review and is based on eliminated activities in the Hylebos. This claim is moot and should be dismissed.

Finally, the Tribe's unsubstantiated attack on the sufficiency of the City's "no net loss" determination implicates a dispute of material fact and so cannot be resolved on summary judgment. This claim alone should be preserved for hearing.

I. BACKGROUND

SSDP No. SHR2015-40000246123 ("SSDP") authorized in- and over-water work related to the Tacoma LNG Facility in the Blair and Hylebos Waterways. As originally proposed, this project was comprised of a barge loading facility on the Hylebos Waterway for marine vessel bunkering and the installation of shore-based fueling equipment for Totem Ocean Trailer Express ("TOTE") vessels (not barges) on the Blair Waterway. *Puyallup Tribe of Indians v. City of Tacoma*, SHB No. 16-002, Appeal of Decision on Substantial Development Permit SHR2015-40000246123 ("Puyallup Appeal"), Exhibit A at 3 (containing the Notice of Decision on the SSDP).

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Following the Tribe's appeal, PSE filed a Voluntary Stipulation giving up the right to undertake certain activities authorized by the SSDP. *Id.*, Puget Sound Energy, Inc.'s Stipulation Restricting SSDP Re: In- and Over-Water in Hylebos Waterway (Jan. 28, 2016). The Voluntary Stipulation strictly limits PSE's in- and over-water activities in the Hylebos Waterway under the SSDP. Declaration of Lorna Luebbe ("Luebbe Decl."), Exhibit 1 at 1-2. The Voluntary Stipulation does not provide for transferring, relocating, modifying or adding the elements of the Project considered in the Tacoma Liquefied Natural Gas Tidelands Final Environmental Impact Statement ("FEIS") or SSDP. *Id.* Under the Voluntary Stipulation, PSE commits to engaging in only a subset of the *previously described and evaluated* in- and over-water work in the Blair Waterway. *Id.* PSE has no future plans to expand activities in the *Blair Waterway* (by either construction or operation) beyond those activities contemplated and authorized by the SSDP. *Id.* The single remaining LNG fueling facility on the Blair Waterway will operate approximately eight hours a week and is designed to fuel a single type of vessel. *Id.*

II. ARGUMENT

A. PSE's Voluntary Stipulation Reduces (but Does Not Reconfigure or Relocate) Project Components

The Tribe argues that PSE's Voluntary Stipulation means something other than what it says. It does not. The clear terms of the Voluntary Stipulation eliminate PSE's ability to develop a marine barge fueling and bunkering facility on the Hylebos Waterway, leaving the TOTE Marine Vessel Fueling System on the Blair Waterway as the only remaining in-water element of Tacoma LNG Facility permitted by SSDP SHR2015-40000246123-5. *See* Luebbe Decl., Exhibit 1 at 1-2. The activities authorized on the Blair Waterway remain unchanged. *Id.*

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The infrastructure on the Blair Waterway is custom-engineered to TOTE's operations, including the loading arm to fuel TOTE's Orca-class vessels. None of the components of the marine bunkering element will (or can) be "transferred" from the Hylebos to the Blair Waterway without the construction of additional facilities, which are not planned and would themselves require countless new permits. In other words, notwithstanding the fact that the SSDP originally authorized both Blair and Hylebos Waterway components, PSE has stipulated to scale down the activities authorized by the SSDP to one component — the Blair Waterway TOTE Marine Vessel Fueling System. *Puyallup Tribe of Indians*, SHB No. 16-002, Puget Sound Energy, Inc.'s Stipulation Restricting SSDP Re: In- and Over-Water in Hylebos Waterway (Jan. 28, 2016).

The Tribe presents no evidence for its bald assertions that any of the now-eliminated elements (including barge loading activities, additional vessel traffic, shoreline improvements, or the "northeastern storage area") will be "transferred" from the Hylebos to the Blair Waterway. Puyallup's Motion at 3-4, 9-14 (alleging that "the barge loading activity that were to occur on the Hylebos will now occur on the Blair waterway"). Nor could they: the Order Granting Request for Reconsideration in Part and Modifying Approval of SSDP SHR2015-40000246123 at 8:17-18 provides that "[t]his [SSDP] permit is only applicable to the proposed project as described above and based upon the information submitted by the applicant." Puyallup Appeal, Exhibit B (containing the Order Partially Granting Reconsideration and Modifying Conditions of Approval of the Shoreline Substantial Development Permit).

The Tribe's contention that PSE plans to "transfer" the bunkering component of the LNG Project from the Hylebos to the Blair Waterway relies on a single hearsay sentence in the Declaration of Lisa Brautigam, an attorney employed by the Tribe. Ms. Brautigam states that "to

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[her] knowledge based on numerous contacts with Puget Sound Energy, the portions of the LNG project planned to occur on or in the Hylebos Waterway will be moved to or operated from the Blair Waterway." Brautigam Decl. at 2. The Brautigam Declaration is dated March 4, 2016. *Id.*

Ms. Brautigam does not disclose to this Board the correspondence between her and PSE in advance of her March 4, 2016. On February 1, 2016, Ms. Brautigam received an email from PSE's Assistant General Counsel, Lorna Luebbe, reiterating the commitment in the Voluntary Stipulation and describing the proposed Blair operations in more detail:

> The LNG is piped from the Tacoma LNG plan storage tank underground approximately 800 feet to an area near the aft end of the TOTE vessel. At that point, the LNG piping exits the ground and extends upward over the Blair approximately 125 feet to the new loading platform. …
>
> From the loading platform, the LNG is transferred to the ship via [a] rigid loading arm … similar to the arm on a concrete pumping truck…. It takes up to four hours to fuel one ship. There are two ships a week, for a total fueling time of up to 8 hours….
>
> **There are currently no commercial opportunities for additional future LNG vessel or barge loading on the Blair waterway**. As the LNG market develops to displace the current practice of loading bunker fuel and diesel onto vessels in Commencement Bay or elsewhere in Puget Sound, PSE would serve this market with a cleaner fuel for a cleaner environment. … **Construction and operation of any barge infrastructure would be subject to the local, state and federal permitting regulations in effect at that time.**

Luebbe Decl., Exhibit 1 at 1-2 (emphases added).

There is not, and has never been, a proposal for a barge loading and bunkering facility on the Blair Waterway. *Id.* Because there is no legal requirement to analyze non-existent project components, the Tribe's claim that "the SSDP did not consider … or analyze a barge loading facility… to be located on the Blair waterway" should be dismissed. Puyallup's Motion at 5.

The Puyallup's' Motion places heavy reliance on *Quinault Indian Nation v. City of Hoquiam*, SHB No. 13-012c (2013), *subsequent proceedings in Quinault Indian Nation v.*

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Imperium Terminal Services, LLC, 190 Wn. App. 696, 360 P.3d 949 (2015), to argue that the SSDP should be reversed for its failure to analyze the "new proposed configuration" of the LNG project. *See* Puyallup's' Motion at 11. Apart from being based on a false factual premise, the Tribe's argument fails. *Quinault* is inapposite.

Quinault addressed a lead agency's decision to issue a SEPA Threshold Determination of Mitigated Determination of Non-Significance ("MDNS"), not the adequacy of an SSDP. *Quinault* also involved the exact opposite threshold determination and factual context. In that case, two industrial facilities (Westway and Imperium Biofuels) received MDNSs for SSDPs required to expand their very similar and adjacent fuel transport and storage activities in Grays Harbor. Before issuing the MDNS, the SEPA co-leads did not consider a third, similar[2] proposal announced for development in Grays Harbor by U.S. Development Group, LLC ("USD"). The Westway and Imperium co-leads also deferred consideration of the potential for impacts of the cumulative rail and vessel traffic impacts of each other's proposals until after the threshold determination was issued. *See Quinault,* SHB No. 13-012c, Amended Order on Summary Judgment at 14-15. The Board granted Quinault's motion for summary judgment, and held that: 1) the USD project was reasonably foreseeable and thus should have been considered cumulatively with the Westway and Imperium Biofuels projects, and that 2) SEPA co-leads cannot delay studying foreseeable impacts until after the threshold determination.[3] *Id.* at 14-16.

---

[2] USD's plans involved construction of a new $50 million bulk liquids rail logistics facility with a 1.1 million-barrel storage capacity receiving about five vessels per month. *See Quinault*, 190 Wn. App. at 701-02; *see also* SHB No. 13-012c, Amended Order on Summary Judgment at 9.

[3] Note that here the City determined that the Tacoma LNG would have probable adverse environmental impacts and issued a Determination of Significance. The FEIS that followed studied the impacts of the Tacoma LNG and its constituent parts, the potential cumulative impacts of a prospective

(continued . . .)

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In other words, a SEPA lead must assess impacts before concluding that such impacts are not significant. *Id.*

The Tribe's reliance on *Quinault* entirely misses the point. Here, the City issued an FEIS and did not defer analysis. The Tacoma LNG SSDP and the underlying environmental review documents analyzed both the Hylebos marine barge bunkering facility and Blair TOTE vessel fueling system. *See* SSDP No. SHR2015-40000246123, attached to Petitioner's Appeal as Exhibit A, Tab 2, at Finding 1. PSE scaled down its proposal. It did not relocate or redesign it. The Tribe offers no authority for its assertion that the SSPD should analyze non-existent "operational activities that were to occur on the Hylebos [and that] will now occur on the Blair Water." *See* Puyallup's Motion at 5. Moreover, the *Quinault* Board never applied its own holding to the SSDP, much less established a precedent on such challenges:

> Other challenges to the MDNS and SSDP's validity based on compliance with the SMA, the local SMP, the Coastal Zone Management Act, and critical areas ordinances are also moot because of the invalidity of the MDNS on other grounds. The Board declines to address these moot issues.

Quinault, SHB No. 13-021c at 21. The Tribe's motion should be denied.

B. The Tribe Fails to Provide Evidence That the City Improperly Delegated or Deferred Analysis

The Tribe's claim that the City improperly deferred or delegated required analysis fails for two principal reasons. Puyallup's' Motion at 4-5, 8.

(. . . continued)
methanol facility on the Blair, and the Puyallup Tribal Terminal permitted for shoreline development, also on the Blair. *See* FEIS at 3.13–3.19, http://cms.cityoftacoma.org/planning/pse/PSE%20LNG%20FEIS%20revised%20 (11-9-2015).pdf (last visited Mar. 17, 2016).

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First, the Tribe ignores the evidence that the City undertook a thorough review of the Tacoma LNG project under all applicable provisions of the SMP/TSMP. *See, e.g.*, Puyallup Appeal, Exhibits A & B (including PSE's SSDP Permit Application, FEIS, the City's Notice of Decision and Order on Reconsideration). This review resulted in a Notice of Decision and Order on Reconsideration that relied on the City's own technical expert reports and analysis and mitigation required under PSE's Joint Aquatic Resource Application ("JARPA") and the FEIS. *See, e.g., id.* at 7-8 (containing the City's Notice of Decision).

Other state and federal agencies also have jurisdiction over aspects of the shorelines and can require additional analysis and permitting. The Department of Ecology has been delegated authority to ensure that all discharges do not interfere with water quality standards. *See* Ch. 90.48 RCW. The U.S. Army Corps of Engineers has statutory authority to permit construction and development that obstructs navigation or results in a dredge or fill on navigable waters. *See* 33 U.S.C. §§ 1344, 403. The U.S. National Oceanic and Atmospheric Administration and Fish and Wildlife Service have authority to regulate potential impacts to species and habitat protected under the U.S. Endangered Species Act. *See generally* 16 U.S.C. § 1539(a)(1). The United States Coast Guard has the responsibility for the overall safety and security of waterfront LNG facilities and LNG-fueled vessels within U.S. territorial waters. *See, e.g.*, 46 U.S.C. § 70101, *et seq.* Such is the nature of the complex environmental permitting systems that have evolved in our nation's federal-state framework, which results in various agencies' concurrent jurisdiction

over shorelines resources, a fact that is explicitly recognized in the Washington Shoreline Management Act,[4] the Tacoma Shoreline Master Program[5], and the SSDP itself.[6]

Concurrent jurisdiction, however, does not provide for concurrent permit review by separate agencies. Permitting review is necessarily sequenced. As a result, permits are routinely conditioned on a permittee's compliance with ***all*** applicable regulations. The Board should reject the Tribe's invitation to construe permit sequencing as improper delegation. Puyallup's' Motion at 5 (faulting the City for not requiring PSE to "secure all federal and state permits before development" prior to development permitting).

Permit sequencing is so ubiquitous, it is found in the Tribe's own projects. For example, the City's May 21, 2012 MDNS for the SSA/Puyallup Tribal Terminal Shoreline Substantial Development Permit SHR2009-40000136019 (which was reviewed for potential cumulative effects in the Tacoma LNG FEIS) contains a number of similar provisions. *See, e.g.*, Luebbe Decl., Exhibit 2 at 4 ("Compliance with the critical areas regulations, as well as other applicable regulations, will adequately prevent or mitigate for any significant adverse environmental impacts to the wetlands...."); at 5 ("Potential significant adverse impacts to fisheries habitat on

---

[4] *See, e.g.*, RCW 90.58.020 ("There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort, jointly performed by federal, state, and local governments, to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines."); *see also* WAC 173-27-060(1) ("[T]hose direct federal agency activities affecting the uses or resources subject to the act must be consistent to the maximum extent practicable with the enforceable provisions of the act, regulations adopted pursuant to the act and the local master program.").

[5] *See, e.g.*, TSMP 1.7.1 ("[D]evelopments ... regulated by this Master Program may also be subject to . . . various other provisions of local, state and federal law."); TSMP 1.8 ("[F]ederal agency activities affecting the uses or resources subject to the Act must be consistent to the maximum extent practicable with the Act and this Program.").

[6] Notice of Decision at 12 ¶¶ 2-3 ("The authorization(s) granted herein is /are subject to all applicable federal state and local laws, regulations, and ordinances. By accepting these approvals, the applicant represents that the developments and activities allowed will comply with such laws....").

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the shoreline will be adequately mitigated through compliance with this [Hydraulic Project Approval] requirement."); at 6 ("The Army Corps of Engineers and the Washington Department of Ecology, Fish and Wildlife Service, and Natural Resources have limited jurisdiction and require permits.... It is the sole responsibility of the applicant to secure all permits required for this project.").

Such conditions do not provide a *per se* legal basis for invalidation, as the Tribe asserts. *See, e.g., Kitsap County v. State Dep't of Nat. Res.*, 107 Wn.2d 801, 806-07, 733 P.2d 526, 529 (1987) (upholding a Board decision requiring future studies, but not requiring future consideration by the Board). This is especially true where, as here, these provisions provide conditions for permit revocation. Puyallup's Motion at 5 (citing the Reconsideration Order at 6:4-7) (the Tacoma LNG Facility "will need to comply with all water quality as well as safety requirements of all applicable permits and authorities. *This information will need to be provided prior to development permitting, this is clarified in the revised condition*"); Notice of Decision at 12, ¶ 5 ("This permit may be rescinded pursuant to *RCW* 90.58.140(8) of the Shoreline Management Act of 1971 and Section 13.10.2 of the *Tacoma Municipal Code* in the event the permittee fails to comply with *any condition thereof*." (emphases added)). In other words, the very provisions cited by the Tribe give the City enforcement authority to rescind PSE's SSDP permit upon non-compliance and therefore ensure that required actions are undertaken.

Second, the Tribe's argument cannot be resolved on summary judgment. The Board reviews SSDP appeals *de novo*. WAC 461-08-500(1). *See, e.g., Coal. to Protect Puget Sound Habitat v. Thurston County*, SHB No. 13-006c at 6, Order Denying Motions to Dismiss and Motion for Summary Judgment (Aug. 6, 2013). The moving party cannot rely on a previous

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SSDP decision "to establish the factual basis for a motion for summary judgment" because to do so "defeats the purpose of *de novo* review." *Id.*; *GMA Advocates v. Potala Vill. Kirkland, LLC*, SHB No. 13-002, at *6 (Aug. 8, 2013) ("Kirkland cannot simply rely on the evidence from the proceedings and arguments made below to prevail before the Board now.... Respondents must still submit evidence to the Board that supports a *de novo* decision and addresses the merits of [petitioner's] claims."). The Tribe cannot obtain summary judgment based solely on an alleged deficiency in the City's review; rather a *de novo* review requires that the Tribe present sufficient evidence to this Board to establish the deficiency. Because the Tribe has failed to do so, its motion fails.

Finally, as the Tribe's "delegation and deferral" claims are based on analysis of construction and operational impacts *in the Hylebos*, they are moot. *See* Puyallup's Motion at 4-5. PSE has stipulated not to exercise the SSDP provisions relating to in-water work in the Hylebos. Because PSE has made an enforceable commitment to, in effect, withdraw portions of its SSDP permit relating to the Hylebos, the Tribe's Hylebos-related claims are moot. *See, e.g., Baker v. Tanger Factory Outlet Ctr., Inc.*, SHB No. 94-53, Order of Dismissal (Mar. 29, 1995) (dismissing a withdrawn permit as moot).

C. The Elimination of Project Components Is Not Piecemealing

The Tribe asserts that Respondents "piecemealed" the LNG project in violation of the SMA. "Piecemealing" occurs where the local authority "allow[s] one portion of the [single] project to proceed while the other portion of the project awaits approval." *Batchelder v. City of Seattle*, 77 Wn. App. 154, 160, 890 P.2d 25 (1995); *see also Merkel v. Port of Brownsville*, 8 Wn. App. 844, 847, 509 P.2d 390 (1973) (improper piecemeal review occurs where a

development is "so interrelated and interdependent that no part of the project can proceed until all provisions have been fully complied with"); *Murden Cove Preservation Ass'n v. Kitsap County*, 41 Wn. App. 515, 526, 704 P.2d 1242 (1985) (in the absence of specific plans for any future development, SEPA does not require consideration of every remote and speculative consequence of an action).

The Tribe offers no competent evidence that the Tacoma LNG project was "piecemealed" because it was not. PSE's Voluntary Stipulation is unambiguous and means what it says: PSE has eliminated the barge bunkering component of the Tacoma LNG Facility on the Hylebos Waterway. Further, PSE has informed the Tribe that its plans in the Blair Waterway are unchanged from those authorized under the SSDP, nor is an expansion technologically foreseeable at this time because the Blair fueling facility is custom-designed for TOTE's Orca vessels. Furthermore, "[t]here are currently no commercial opportunities for additional future LNG vessel or barge loading on the Blair waterway." Luebbe Decl., Exhibit 1. If, at some unknown future point, new market opportunities materialize, they would of course be subject to applicable local, state and federal permitting. *Id.*

Elimination of project components is not "piecemealing." The scaled-down project on the Blair Waterway is not dependent on the Hylebos barge bunkering component, which has been abandoned. There is no evidence that PSE has a specific plan or opportunity to expand the operation on the Blair Waterway beyond the fueling of the TOTE vessels. The Tribe's suspicion and speculation of piecemealing does not make it so.

The Tribe's own authority, *Donovan v. Sperry Ocean Dock*, refutes its piecemealing argument. SHB No. 10-024, Findings of Fact, Conclusions of Law, and Order (July 13, 2011).

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In that case, the evidence before the SHB was that the applicants "ha[d] no plans to pursue their 2007 expansion plan to add facilities." *Id.* at 17. Petitioners' skepticism of the applicant's assertion was insufficient to establish improper segmentation. *Id.* The SHB held that no piecemealing had occurred. *Id.* It is the same here. Because the Tribe has failed to present evidence of some future PSE plan not evaluated in the SSDP and FEIS, its allegation of "piecemealing" should be dismissed.

D. The Tribe Cannot Challenge the City's "No Net Loss" Analysis Without Specific Evidence of Alleged Deficiencies

The Tribe challenges the sufficiency of the City's "no net loss" analysis without identifying any supporting evidence in the record. Instead, the Tribe directs the Board to hunt down facts that could support its allegations. *See* Puyallup's Motion at 3, n.1 ("This Statement of Facts is based on the records of the Appeal and the Declaration of Lisa Brautigam in Support of the Motion (and exhibits thereto)."); *id.* at 15 (neglecting to cite any evidence to support the allegation that the City deferred *unnamed* "key" elements of its analysis). The Tribe's motion should be denied.

III. CONCLUSION

For the foregoing reasons, PSE respectfully requests that all claims raised in the Tribe's Motion be denied, except for the challenge to the adequacy of the City's "no net loss" determination, which should be preserved for hearing.

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DATED: March 18, 2016

STOEL RIVES LLP

Erin L. Anderson, WSBA No. 23282
Rita V. Latsinova, WSBA No. 24447
Sara A. Leverette, WSBA No. 44183
Attorneys for Respondent Puget Sound Energy, Inc.

CERTIFICATE OF SERVICE

I, Sharman D. Loomis, certify and declare:

I am over the age of 18 years, make this Declaration based upon personal knowledge, and am competent to testify regarding the facts contained herein. On March 18, 2016, I served true and correct copies of *Puget Sound Energy, Inc.'s Response In Opposition To Puyallup Tribe's Dispositive Motion For Reversal And Remand Of SSDP SHR2015-40000246123* upon the following persons in the manner listed below:

Lisa A. Brautigam Law Office Puyallup Indian Tribe 3009 E. Portland Ave. Tacoma, WA 98404 Email: Lisa.Brautigam@puyalluptribe.com Attorneys for Petitioner Puyallup Tribe of Indians	☒ Email ☒ U. S. Mail ☐ Legal Messenger ☐ Overnight Mail
Laura J. Watson Asst. Attorney General Office of the Attorney General Ecology Division P.O. Box 40117 Olympia, WA 98504-0117 Email: lauraw2@atg.wa.gov Attorney for Respondent Dept. of Ecology	☒ Email ☒ U. S. Mail ☐ Legal Messenger ☐ Overnight Mail
Carolyn A. Lake Seth S. Goodstein Goodstein Law Group PLLC 501 S. G Street Tacoma, WA 98405 Email: clake@goodsteinlaw.com Email: sgoodstein@goodsteinlaw.com Attorneys for Respondent Port of Tacoma	☒ Email ☒ U. S. Mail ☐ Legal Messenger ☐ Overnight Mail

Jeff H. Capell, WSBA #25207 Deputy City Attorney Office of the City Attorney 747 Market St., Rm. 1120 Tacoma, WA 98402-3767 Tel: 253-591-5885 Email: jcapell@ci.tacoma.wa.us Attorneys for City of Tacoma Planning & Development Services	☒ Email ☒ U. S. Mail ☐ Legal Messenger ☐ Overnight Mail
Scott M. Missall, WSBA #14465 Athan E. Tramountanas, WSBA #29248 Nicholas G. Thomas, WSBA #42154 Short Cressman & Burgess PLLC 999 Third Ave., Ste. 3000 Seattle, WA 98104-4088 Tel: 206-682-3333 Email: smissall@scblaw.com Email: athant@scblaw.com Email: nthomas@scblaw.com Attorneys for Petitioner, The Puyallup Tribe of Indians	☒ Email ☒ U. S. Mail ☐ Legal Messenger ☐ Overnight Mail

I certify under penalty of perjury pursuant to the laws of the State of Washington that the foregoing is true and correct.

DATED: March 18, 2016 at Seattle, Washington.

Sharman D. Loomis, Practice Assistant

APPENDIX F

BEFORE THE SHORELINES HEARINGS BOARD

FOR THE STATE OF WASHINGTON

THE PUYALLUP TRIBE OF INDIANS, a Federally Recognized Indian Tribe, Petitioner, and CITY OF TACOMA, a Municipal Corporation; PUGET SOUND ENERGY, a Washington Corporation; PORT OF TACOMA; and WASHINGTON STATE DEPARTMENT OF ECOLOGY, Respondents.	SHB No. 16-002

TRANSCRIPT OF PROCEEDINGS
VOLUME V

Pages 1 through 241

May 13, 2016
TUMWATER, WASHINGTON

VALERIE ALLARD, CCR 3040
Pennington Court Reporting
21340 191st Avenue SE
Renton, Washington 98058
425.432.1399

Q. What is it?
A. So that is what we call the loading platform in the Blair.
MS. LATSINOVA: Move to admit R-49 into evidence, Your Honor.
PRESIDING BOARD MEMBER MARCHIORO: Ms. Anderson, any objection?
MS. LISA ANDERSON: No objection.
PRESIDING BOARD MEMBER MARCHIORO: Mr. Capell or Ms. Lake, any objection?
MR. CAPELL: No objection.
MS. LAKE: No objection.
PRESIDING BOARD MEMBER MARCHIORO: R-49 is admitted.
(Exhibit No. R-49 admitted.)
BY MS. LATSINOVA:
Q. Mr. Hogan, can you please describe the design of the loading platform?
A. Yes. It is a concrete pier, essentially, built on steel piles. I believe there's 48 piles in total. Again, it's a concrete decking surface. It's pretty straightforward.
Q. How far out into the waterway does it go? I think we all remember the catwalk that's there now. Is it short of the catwalk?
A. Well, you can see on this, this is superimposed over the existing catwalk. I believe the end is roughly 130 feet

from the shoreline. It's just inside the existing platform that's already there.

Q. And so was this custom designed for TOTE?

A. Yes.

Q. So can any other ship refuel at this dock?

A. No.

Q. Why is that?

A. The reason is is that the way this works is we have a -- the piping comes out. This mast right here does not show it, but there will be a customized loading arm on top of that -- it looks something like a bucket truck like you'd see -- so it's articulated in a couple of places. That reaches up and out to the fueling location on the aft end of the TOTE ship, which is quite a ways up in the air. I want to say something on the order of 50 to 90 feet up in the air depending on the tide. So that's purpose built just for them, and I can't imagine another instance where it could be used for something else.

Q. You mentioned that the loading dock is made out of concrete; is that right?

A. That's correct.

Q. And do you recall there was a discussion with Mr. Deshler? He was concerned that the concrete would cast a hard shadow that would be problematic for fish that swim underneath. Do you recall that?

You need to let her finish her question and then answer.

THE WITNESS: Oh, I'm sorry.

BY MS. LISA ANDERSON:

Q. Just to clarify. Are you aware of how many ships per week call on the Port of Tacoma?

A. No.

Q. Are there other ships that call on the Port of Tacoma per week?

A. Yes.

Q. During your testimony yesterday, you, I believe, referenced that due to TOTE switching over to LNG for two ships per week there would be significant reductions in emissions; is that correct?

A. Correct.

Q. Do you remember the percentages of those reductions?

A. Roughly.

Q. And what is your knowledge based upon on those percentages?

A. It is based upon information that TOTE has provided on the performance of their existing engines relative to the new engines that they're installing in the two vessels.

Q. So those percentages that led to your conclusion that they'll be a significant reduction in emissions, is that a significant reduction in emissions in Puget Sound?

A. It's a significant reduction for those two vessels.

Q. For those two vessels, but not in Puget Sound as a whole?
A. It shouldn't be, no.
Q. TOTE switching over to LNG, do you have any knowledge as to what the reductions for Puget Sound would be as result of their two ships per week switching technology?
A. No, I don't.
Q. Do you have any knowledge of the reductions overall of what would happen with all the ships switching their technology, whether it be LNG or another technology?
A. No, I do not.
Q. I may have asked this, and I apologize if I did, are you aware of any other ships in the Port of Tacoma that are switching over to LNG as a fuel source?
A. I'm aware of other ships, other companies that are considering it.
Q. Are you aware of their timeline for switching over?
A. We are under nondisclosure agreements with other companies that have spoken to us about using LNG, so I can't answer that.
Q. I'm going to jump ahead a little bit to the testimony you gave this morning that the loading facility on the Blair and the pier, the concrete pier loading area, is custom designed for TOTE. Should another shipping company switch over to LNG as fuel for their ships, how would you provide LNG to them?

A. It would be expected that they would bunker the same way they do now. So a bunker barge would bring them the fuel at whatever location they moor at.

Q. And where would those bunker barges load the LNG?

A. As of right now, we would have to design facilities either on the Hylebos or modify the Blair facility.

Q. Are you aware of any barges already designed and capable of bunkering LNG?

A. There's one barge in North America that is still under construction that will be the first barge for bunkering LNG.

Q. And where will that service area be for that barge?

A. It will go to Jacksonville, Florida.

Q. Yesterday you testified that one of the benefits or reasons that PSE, I believe, was successful in getting the contract or agreement with TOTE to provide LNG was that you had a right of first refusal on the property that the LNG facility is designed to be placed on; is that correct?

A. That is my belief. TOTE never provided us a specific list of reasons of why we were successful, but I believe our adjacency was beneficial.

Q. And so did PSE, to your knowledge, enter into a written agreement with the Port of Tacoma for that right of first refusal?

A. I do not know that.

Q. When did PSE obtain the right of first refusal?

deleted from the NPL list, and with some exceptions, it is generally assumed that the Blair Waterway sediment is cleaner than the Hylebos Waterway. Therefore, for this review EPA's main concerns from a CERCLA and sediment quality perspective are focused on the project components in the Hylebos Waterway. We have no concern with the work as proposed in the Blair Waterway, and believe the standard CERCLA paragraph language below will be sufficient."

Q. Mr. Tornberg, you were asked to testify earlier about a stipulation that was entered in this action, correct?

A. Correct.

Q. Do you recall that?

A. I do.

Q. What is your understanding of the affect of that stipulation?

A. That we would not be developing facilities in the Hylebos as a result of the stipulation.

Q. Do you have any understanding of whether there are any changes to the project as proposed in the Blair?

A. There are no changes.

MS. ERIN ANDERSON: I would move to admit R-29.

PRESIDING BOARD MEMBER MARCHIORO: Mr. Missall, any objection?

MR. MISSALL: No.

PRESIDING BOARD MEMBER MARCHIORO: R-29 is

From: Sherman, Bill (ATG)
To: Public Comment
Subject: comment on Tacoma LNG draft SEIS
Date: Wednesday, November 21, 2018 1:56:18 PM
Attachments: CEP comment letter on PSCAA Tacoma LNG draft SEIS.pdf

Good afternoon. I attach a letter with comments on the draft SEIS for the Tacoma LNG project.

Thank you,

Bill Sherman

William R. Sherman
Counsel for Environmental Protection
Washington State Attorney General's Office
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0863-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0863-2 13. LCA Inputs and Assumptions - Natural Gas Source
0863-3 8. No Action Alternative

Bob Ferguson
ATTORNEY GENERAL OF WASHINGTON
Counsel for Environmental Protection
800 Fifth Avenue, Suite 2000
Seattle, WA 98104

November 21, 2018

Email: publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

Re: Comment on Draft SEIS

Thank you for this opportunity to comment on the Draft Supplemental Environmental Impact Statement for the proposed Tacoma Liquefied Natural Gas Project. I offer two categories of comment: substantive and procedural.

Substantively, the Attorney General's Office's Counsel for Environmental Protection Unit agrees with and incorporates here the comments submitted by the Washington State Department of Ecology.

In addition, we encourage the Agency to revise the draft SEIS to fully respond to other commenters' concerns about the calculations of the short- and long-term global warming potential value of methane. The draft SEIS should ensure that it applies the most current, valid, peer-reviewed assessment of the global warming potential of emissions related to this project. Similarly, the draft SEIS assumes that all gas associated with the Project will come from Canada, and bases its calculations on that assumption. It is not clear why that assumption should be expected to hold true for the 40-year lifespan of the Project, especially as United States natural gas production has increased substantially in recent years. Consequently, the SEIS should be revised to anticipate and adequately review the possibility of a change in the source and makeup of that gas over the facility's 40-year lifespan.

Procedurally, the SEIS should be significantly revised to accurately identify the actual circumstances and current status of the construction and permitting process on the site. As currently drafted, the SEIS evaluates a No-Action Alternative that can only be described as fictional. In so doing, the draft SEIS raises questions about whether the Agency's SEPA process allowed the kind of "snowballing effect" that the Washington Supreme Court warned about in *King County v. Washington State Boundary Review Board for King County*, 122 Wn.2d 648, 664

(1993) (concluding that the appropriate time to prepare an EIS is when "the responsible agency determines that significant adverse environmental impacts are probable following the government action").

As you are aware, the Project began construction in 2016. A PSCAA inspector visited the project site on March 15, 2017, and observed activity indicating that the facility should have, before that activity, submitted a Notice of Construction application and received an Order of Approval. PSCAA issued a Notice of Violation on that basis on April 12, 2017. Although the project developer then submitted a Notice of Construction application, construction has continued at the site. PSCAA has apparently taken no further action investigating or enforcing the Notice of Violation, beyond accepting the NOC application and undertaking this SEPA process.

The Draft SEIS, however, does not appear to acknowledge that construction of any type has occurred on the Proposed Action. In fact, it appears to assume that construction, and therefore impacts of construction, are still contingent on the selection of an alternative. That of course is not the case, and therefore the Draft SEIS's description of the Proposed Action and No Action Alternative fail to comport with the actual status of the project site. In short, the No Action Alternative as described in the Draft SEIS is no longer an available alternative.

A few specific examples:

- The Draft SEIS's summary of the No Action Alternative states that "the existing land uses would continue at the proposed Tacoma LNG Facility site," p. 1-2. It is not clear that this could be the case; if so, substantial demolition and removal activity would be required. The Draft SEIS should include an accurate description of the No Action Alternative, or clearly indicate where the No Action Alternative diverges from the actual status of the project site.

- The Draft SEIS section on construction emissions is based on construction activities as defined in the September 30, 2015 Final Environmental Impact Statement (FEIS) (section 2.3 of the FEIS). Did PSCAA determine whether construction activities as actually conducted to date are substantially identical to those defined in the FEIS? If so, the SEIS should so indicate; if not, the SEIS should make such a determination.

- Section 3 of the Draft SEIS, "Description of the No Action Alternative," contains a number of statements that do not comport with the present status of the project site. For instance, on page 3-1, the draft states that "under the No Action Alternative, the Proposed Action would not be implemented." Because construction has advanced, those aspects of the Proposed Action would be, and in fact have been, implemented.

- The Draft SEIS discusses construction impacts on pp. 4-6 – 4-7, but fails to indicate that more than two years of the "four-year period" of construction have already occurred. The

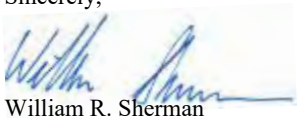
0863-4 8. No Action Alternative
0863-5 8. No Action Alternative
0863-6 8. No Action Alternative
0863-7 8. No Action Alternative
0863-7 cont'd 8. No Action Alternative

Draft SEIS does not indicate whether the statements of GHG emissions on pp. 4-7 and 4-8 are based on construction as projected before the project began, or based on activities that have already occurred.

- In addition, the Draft SEIS asserts that "There are no construction impacts associated with the No Action Alternative." p. 4-9. This is plainly incorrect. Because construction impacts have already occurred, an alternative involving removal of the project would have further impacts associated with either demolition or repurposing of the already-built facilities.

Taken together, these shortcomings render the Draft SEIS's consideration of a No-Action alternative insufficient, and raises the concern that the SEPA process that produced it was insufficient to avoid the "snowballing effect" discussed above. We encourage the Agency to address those concerns prior to issuance of the final SEIS and issuing an Order of Approval.

Sincerely,



William R. Sherman
Counsel for Environmental Protection Unit

From: ECY RE SWRO SEPA COORDINATOR
To: Public Comment
Cc: Toteff, Sally (ECY); Blank, Ben (ECY); Caudill, Neil (ECY); Betsy Wheelock
Subject: ECY SEPA 201805572 - Draft SEIS Puget Sound Energy Tacoma LNG Project - Comments
Date: Wednesday, November 21, 2018 1:46:23 PM
Attachments: 201805572 ECY Comments for PSE Tacoma LNG Draft SEIS.PDF
Importance: High

Carole Cenci, Compliance Manager:

Attached are Ecology's comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the Puget Sound Energy Tacoma Liquefied Natural Gas Project (Ecology SEPA No. 201805572). This is the original final copy. Comments are due today, November 21, 2018.

Please reply to this message for confirmation.

Thank you,

Morgan L. Dorner
State Environmental Policy Act Coordinator
WA Department of Ecology | SWRO
P: 360-407-6313 | **F:** 360-407-6305
swrosepacoordinator@ecy.wa.gov
SEPA Register: http://ecyapsea/separ/Main/SEPA/Search.aspx

0864-1 18. LCA Inputs and Assumptions - Marine Diesel Oil
0864-2 10. LCA Calculations
0864-3 17. LCA Inputs and Assumptions - Peak Shaving
0864-4 13. LCA Inputs and Assumptions - Natural Gas Source

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

November 21, 2018

Carole Cenci, Compliance Manager
Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101

RE: Comments on Draft Supplemental Environmental Impact Statement
for Puget Sound Energy - Tacoma Liquefied Natural Gas Project

Dear Carole Cenci:

Thank you for the opportunity to comment on the Draft Supplemental Environmental Impact Statement (SEIS) for the Puget Sound Energy Tacoma Liquefied Natural Gas Project. We appreciate that the analysis includes a greenhouse gas (GHG) life cycle analysis related to the proposal. The state of the science underlying life cycle analysis has advanced in recent years and continues to progress.

Regarding the GHG analysis, Ecology offers several comments:

- Our technical experts note that marine emission comparisons in the analysis should be to diesel, not Marine Diesel Oil (MDO), as heavier fuels are being phased out in nearshore operations. Also, because this project would require a large amount of electricity and create new demand, the analysis would be more accurate if it used current marginal power emission factors.

- In the evaluation of emissions from peak shavings, we don't understand how peak shaving could result in a net emissions decrease because energy is needed to liquefy the natural gas. This should be clarified in the Final SEIS. Additionally, the LNG converted back into natural gas for peak shaving should be evaluated against natural gas thermal combustion or power generation rather than petroleum, because Washington does not have significant petroleum based power generation.

- The analysis assumes that 100% Canadian natural gas would be used. If correct, this could cause fuel shuffling that results in an increased use of non-Canadian natural gas for other projects.

- If analyses in the Final SEIS lead to consideration of mitigation, technical expertise from Ecology is available to assist with calculations, determinations, and mitigation. Specifically, we could assist with the design of mitigation strategies that would result in emission reductions that are:

    - real, specific, identifiable, and quantifiable;
    - permanent;
    - verifiable; and
    - additional to existing law, rule, or supplementary requirements.

- Mitigation projects occurring within Washington are typically more easily tracked and accounted for, and support more accurate state GHG inventories. In-state actions would provide the added benefit of helping Washington reach its GHG reduction targets.

Again, thank you for the opportunity to comment. Please do not hesitate to contact Ben Blank at Ben.Blank@ecy.wa.gov or me at Sally.Toteff(&,ecy.wa.gov if you have questions about our comments.

Sincerely,

Sally Toteff

Southwest and Olympic Regional Director

(MLD:201805572)

cc: Ben Blank, Climate Policy Section Manager
Neil Caudill, Senior Carbon Reduction Planner
Betsy Wheelock, Project Manager, PSCAA

Carole: Thank you. Jenn Adrien?

Jenn: Thank you for the opportunity to speak this afternoon. My name is Jenn Adrien. I'm the vice president for communications with the Economic Development Board for Tacoma-Pierce County. The organization I work with is in the business of helping companies create and retain family wages jobs for residents.

[01:02:04] But more than that, I'm a fifth generation Tacoman. I grew up in the shadow of the Asarco smelter. Tacoma's polluted, gritty past is one in which I spent the entirety of my childhood. Thanks to a lot of hard work, today, we experience a city that is far cleaner than that of my parents and grandparents. The LNG facility will allow us to take it yet another step forward. But what's most important to me is that I am now the mother of a sixth generation Tacoman. He is the reason I am here to express my support for the PSE LNG facility.

This draft SEIS published by your agency earlier this month clearly shows that replacing transportation diesel fuel with clean burning LNG has a strong environmental benefit. Every child and adult in the region, everyone in this room, people who live and work near the industrial areas, and yes, my own child will be granted a healthier environment, when LNG replaces diesel.

[01:03:10] In addition to the environmental benefits of LNG, our community needs a reliable supply of natural gas 365 days a year. Like many others in this very room, I use it to heat my home, wash my clothes, and prepare food for my family. Pierce County is among the fastest growing counties in the country. And new residents add to the demand for natural gas every day. The solutions to meet future demand are pipeline expansion or storage. Natural gas storage at Tacoma LNG helps ensure that natural gas remains available all year round, for residents and businesses, even in the times when demand and usage peak, such as cold, winter days.

I urge you promptly to complete your environmental review and issue the air permit, so that this project can move forward.

[01:04:07] It's better for the environment. It's good for jobs. And it will allow us to give our children a better Tacoma than what was passed to us. Thank you.

Bruce: Members of the agency, thank you for this opportunity to speak today. Welcome to the South Sound, by the way. I am Bruce Kendall, president and CEO of the Economic Development Board for Tacoma-Pierce County. We're in the business of helping companies create and retain family wage jobs for our citizens. Some of our clients are home grown. And others come from regions around the globe. In every case, they, like us, embrace a greener, more productive energy future that supports good jobs. That's why I'm here today to express my support for Puget Sound Energy's liquified natural gas facility.

[00:04:04] Replacing transportation diesel fuel with clean burning LNG has strong environmental benefits as shown in the draft supplemental environmental impact statement published by the agency on October 8. We now urge the agency to issue the necessary permits for the project to proceed. As you know, from your research, switching from diesel to LNG reduces green house gas emissions by nearly 15%, sulfur dioxide emissions by over 99%, and nitrogen oxide emissions by nearly 85%, all while eliminating visible particulate matter produced by ships by more than 85%.

It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in. This is no esoteric matter. Every child and adult, in the region, including everyone in this room, and particularly those who live or work near industrial areas, will be granted a healthier environment when LNG replaces diesel.

[00:05:07] We are so fortunate to have companies like Puget Sound Energy stepping up to make these investments on our behalf. It's also important to note that LNG powered ships will substantially exceed the North American emission control area requirements established by the International Marine Organization. In addition to helping with the environment, there are some economic benefits that are substantial. The project will create at least 250 construction jobs and over 300 indirect jobs due to the construction. And after the construction, another 125 permanent jobs.

The study is clear. It's time for the permits to move forward. It's good for the environment. It's good for human health. And it's good for jobs. Thank you.

Carole: Thank you, Mr. Kendall. The next speaker is Eric Johnson. And I only see one other person in the front, so I'm going to call the names again.

Carole: Thank you for your comments. Lou Paulsen.

Lou: Good afternoon, and thank you for the opportunity to speak today. My name is Lou Paulsen. I am the director of Strategic Operations Projects and Risk Management with the Board of Tacoma. And I am here to speak on behalf of the commissioners of the Board of Tacoma. The board is pleased that the SEIS confirms that we have long believed. That LNG, while not a perfect solution, is a step in the right direction, as the maritime shipping industry improves its impact on the environment. One day, renewable technology may be able to replace fossil fuels in the shipping industry.

[00:18:00] But that day is not now and won't be for many years. In the meantime, LNG is a better choice as evidenced by the SEIS. The maritime industry is investing heavily in LNG as a better alternative to the heavy fuel currently used in ships. Most new large ships are being built with dual fuel capability and will be able to use LNG. Exemplifying this, and largely for environmental reasons, Carnival Cruise Lines and others are making the transition from traditional fuels to LNGs. And BC Ferries, to the north of us, is now operating on LNG.

This facility will be a critical piece of our port infrastructure. It being in the tide flats and closed to our terminal operations will help the port remain competitive into the future. And local investments in LNG means that, in the future, cleaner ships will call our port, and the use of LNG will improve the local air quality.

[00:19:00] It will mean cleaner air for the men and women working in the tide flats and in the local community. Importantly, Puget Sound Clean Air Agencies use the correct approach to modeling emissions. The analysis is consistent with the Kyoto Protocol, the Paris Climate Agreement, USEPA, Washington State Department of Ecology, and its own policies. To deviate from this approach would be inconsistent with federal and state standards. The Port of Tacoma requests that Puget Sound Clean Air Agency make the draft SEIS final and allow this project to move forward. Thank you.

Steve: Thank you. Next up, Norma Ramirez. Next up, Tom Pierson?

[05:17:00]

Tom: Good evening. I'm Tom Pierson. I'm president and CEO for the Tacoma-Pierce County Chamber. I actually live here locally, Pierce County, South End. And I appreciate the opportunity to comment. We've been hearing from lots of folks about the greenhouse gas emissions and which formula is best to calculate emissions here in Tacoma. I, for one, haven't dated a climate scientist, I'm not a climate scientist. But what I'd like to do is highlight the bigger picture. And it starts with TOTE Maritime.

This conversation is happening because, in 2010, eight years ago, the United Nations and International Maritime Organization, the IMO, set rules regulating shipping companies to make serious reductions to emissions.

[05:18:02] And then, in April, the IMO said by 2050, global shipping industry must reduce its greenhouse gas emissions by 50% by the 2008 levels at least. They said that the stronger mandate lines line up with the Paris Agreement, temperature goals, and the path laid towards eliminating greenhouse gases entirely. TOTE Maritime stepped up. Imagine that. a locally based company who understands first hand how badly we need to protect the environment. It has been amongst the first, in the industry, to do so.

Because while we may argue the fine points of the formulas used here for this year or for that year, IMO has already set standards for maritime and for TOTE that has taken the lead to invest in technologies that will make the ships forever cleaner. In the context and the reality of the world, beyond Pierce County, the value of LNG as maritime fuel is even greater, using LNG results and real reduction in air particulates.

[05:19:10] While we may bicker the formulas to use, there's no question LNG is cleanest burning commercially available fuel for ships. And it is also the step in the right direction right now. Every day we are circling, it's another day that we've missed an opportunity for cleaner air here in Tacoma, here in Pierce County. I urge the people on this panel to be guided by the things that we know today. Take action today. TOTE has not hesitated to do what they can. And we should follow their lead and do the same. In closing, this project strengthens us by being united around the shared values.

Environmental stewardship, social justice, and economic prosperity. Thank you.

[05:20:00]

Steve: Okay. Before I call up the next speaker, just to give you a heads up, the next ones that are cued up after that group are Wendy Pantoja, Carole Sue Braaten, Carol Umbehocker, and Rayna Holtz. So, next up is Terry Velasquez. Chuck Valdez?

Carole: Thank you. Jordan Royer.

Jordan: Thank you for being here, and thank you for taking public comment. My name is Jordan Royer, and I'm the vice president for external affairs for the Pacific Merchant Shipping Association. I'm also with the Manufacturing Industrial Council of Seattle and now the South Sound Manufacturing Industrial Council. And I'm speaking on all of their behalf. First of all, a little, tiny bit of history. Dennis McLaren, when he was the chair of the board, started this ball rolling, with all of us in the industry, saying we needed to reduce our emissions. We needed to get ahead of all of these things.

[00:34:00] And we needed to clean the air. We pushed for a strong MARPOL Annex VI, which led to the emissions control area 200 miles out from shore. We were the first. Canada followed. Still waiting for Mexico to follow. And what came out of that is that TOTE decided that it would be a better idea for them to actually to all of the way and go to LNG because that's much cleaner. It reduces sulfur. It, virtually, reduces risk of oil spill. All of these things are very good. And they're an innovative company.

And the governor, at that time, just four years ago, said that this is the first time a tax incentive will be tied to concrete carbon emission reductions and includes other real accountability measures to ensure taxpayers receive maximum return on their investment. That was legislation that was passed at the state legislature to encourage this to happen. Somebody on your board, Jessica Finn Coven, the director of climate solutions, Jessica Finn Coven, the director of climate solutions, said, at the time, "I'm very pleased they are looking at ways to significantly reduce the greenhouse gases."

[00:35:00] That should be applauded. I'm part of also the governor's Maritime Blue. This is part of that. It's being discussed all of the time. The shipping industry is moving towards this. This is the bridge fuel. You cannot just eliminate all fossil fuels in the shipping industry. No way to move a 900 foot ship on electric motors yet. It would be nice if there were, but there's not yet. So, really, and I think your study and all of the time that we've spent on this really shows that this is going to help things. It's going to reduce greenhouse gases.

It's going to reduce sulfur. It's going to reduce nitrous oxides. It's going to make a cleaner environment for all of us. And TOTE

should be applauded for innovating the way they have, on so many other things like redundant propulsion systems, permanent ballast tanks. They've flushed no ballast out into the water. So, there's no invasive species risk. So, all of these things are very important. And if companies that do all of this get the rug pulled out from under them, after being encouraged to do things, there's not going to be much use in any of us in participating in Maritime Blue or any other thing. Thank you.

1141-1 23. General Support

[00:36:02]

Carole: Thank you. Greg Unruh.

Greg: Thank you for the opportunity to speak today. My name is Greg Unruh. And I am board chair of the Economic Development Board for Tacoma-Pierce County. I'm here today to express my support for Puget Sound Energey's LNG facility. I concur with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 draft SEIS issued by the Puget Sound Clean Air Agency.

And I support the agency in issuing necessary permits for the project to proceed. In addition to the environmental benefits, the LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs, due to the construction.

[00:37:10] After the construction, the economic activity from the project will create another 126 permanent jobs. I have lived and worked in Pierce County for the past 30 years and have seen amazing improvements in our economy and our environment. Our companies have embraced a strong environmental ethic and strive every day to do the right thing. Their customers and their workers demand it. And LNG is another step, in the right direction. Thank you.

1960-1 23. General Support

From: Betsy Wheelock
To: Public Comment
Subject: FW: RE the LNG Project
Date: Wednesday, November 21, 2018 4:18:06 PM
Attachments: fax-2013813.pdf

From: Carole Cenci
Sent: Monday, November 5, 2018 9:07 AM
To: Betsy Wheelock
Subject: FW: RE the LNG Project

LNG comment.

From: Main Fax
Sent: Thursday, November 01, 2018 2:45 PM
To: Carole Cenci
Subject: RE the LNG Project

From: no-reply@sendfax.io [mailto:no-reply@sendfax.io]
Sent: Thursday, November 1, 2018 1:45 PM
To: Main Fax
Subject: New 1 page fax from 3107832000

You've received a fax!

- From: 310 783 3111 (3107832000)
- To: 2063437522
- Pages: 1
- Fax Date: 11/1/2018 1:45 PM PDT

HONDA

American Honda Motor Co., Inc.
1919 Torrance Blvd.
Torrance CA 90501-2746
Phone (310) 783-2000

November 1, 2018

Puget Sound Clean Air Agency (PSCAA)
Attn: Public Comment
1904 3rd Ave Suite 105
Seattle, WA 98101

Subject: TOTE MARITIME ALASKA LNG PROJECT

Good afternoon,

I am writing as the head of logistics at Honda, longtime partners with TOTE Maritime. We have followed with great anticipation TOTE's conversion to LNG as it aligns very closely with our corporate initiative to leave the world better than we find it today (our "Blue Skies for Our Children" initiative).

I lead the teams responsible for shipping automobiles from factories around the world to our dealerships in the U.S. As you can imagine this activity creates a significant carbon / GHG footprint, which we are striving to reduce. We do this by collaborating with likeminded Ocean Carriers, Railroads and Trucking Partners who are proactively seeking to reduce the carbon footprint and GHG emissions related to their trade.

I was concerned to hear of delays in TOTE Maritime's conversion plan when I last inquired. It seems as though the environmental review has taken on a life of its own and has gone on far too long already. I have seen this happen in other regions to the detriment of the Port's competitiveness and ability to serve the growing demand of shippers (like Honda) for clean air alternatives. Further delay puts the port of Tacoma (in my opinion) at a competitive dis-advantage while continuing to un-necessarily pollute our environment. As I understand them, the benefits of this conversion are quite clear:

- Nearly 14% reduction in GHG
- The practical elimination of particulate emissions
- 100% reduction in SOX
- 90% reduction in Nitrogen Oxides

We can all be proud of these outcomes. As a company concerned with the environment we leave our children and grandchildren, I felt it important to express my concern regarding the delays and urge you to move swiftly forward with the approvals necessary to enable TOTE's LNG conversion plan.

Sincerely,

AMERICAN HONDA MOTOR CO., INC.

Chuck Kendig
AVP Automobile Operations / Logistics

1261-1 23. General Support

Laborers' International Union of North America - Local No. 252

(253) 383-1493
FAX (253) 597-4980

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Puget Sound
Clean Air Agency

November 15, 2018

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle, WA 98101

Re: Puget Sound Energy Proposed Tacoma LNG Project Final Environmental Impact Statement.

The hard-working men and women of Laborers' Local 252 are stakeholders in the construction and maintenance of the LNG facility being constructed by Puget Sound Energy at the Port of Tacoma.

Our members are trained to build and maintain the liquid gas infrastructure of our country and are the best at doing what we do. We are proud to be part of the solution to reduce the overall emissions at the port of Tacoma. Using LNG to cut particulate matter produced by ships more than 85 percent will give our members, our families, and our community cleaner air to breathe.

Also, overall, the switch to LNG from the current diesel will be good for the long-term impact of greenhouse gasses. The Draft Supplemental Environmental Impact Statement stated, "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine result in reduced life-cycle GHG emissions."

This project is a step in the right direction to reduce particulates in our air, provides good, family-wage jobs for our community, and will help us bridge to cleaner, greener fuels.

Please approve this project in Tacoma. Thank you.

In solidarity,

Brian Belarde
Business Manager/Secretary-Treasurer

1267-1 23. General Support

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NOV 21 2018
Puget Sound
Clean Air Agency

Pacific Coast Office
World Trade Center -West
2200 Alaskan Way, Suite 110
Seattle, WA 98121
(206) 443-1738
Fax (206) 443-0917

November 20, 2018

To the Puget Sound Clean Air Agency:

I am writing on behalf of the Transportation Institute (TI) in support of the findings in the Puget Sound Clean Air Agency's Draft Supplemental Environmental Impact Statement for the proposed Tacoma liquefied natural gas project to be located in an area zoned as Port Maritime Industrial and owned by the Port of Tacoma. We respectfully ask that the report findings that the Proposed Action sufficiently improves regional air quality relative to the No Action Alternative and lead to a rapid approval of any further permits needed for the completion of the project without any further hindrances or delay.

The Transportation Institute was established in 1967 as a Washington-based, non-profit organization dedicated to maritime research education and promotion. The Institute's member companies participate in all phases of the nation's deep sea foreign and domestic shipping trades, and barge and tugboat operations on the Great Lakes and on the 25,000 mile network of America's inland waterways. These operations embrace deep-sea and river passenger vessels, and liquid, dry-bulk, container and special purpose ships. Many are contracted to the U.S. military services. All are of U.S. registry -- crewed by American citizens operating under the world's highest safety standards, and proudly flying the American flag. With offices on the East and West Coasts (Seattle), the Transportation Institute supports a wide range of programs promoting the strength of America's maritime capability. Here in the Pacific Northwest our members include Alaska Tanker Company, Crowley Maritime, Matson Navigation, and TOTE, Inc.

The Transportation Institute has a long history of working with TOTE on their vision to use clean LNG for the propulsion of their diesel-electric ORCA Class vessels. The clear expectation at that time was for the effort to get underway and engender the support of a community having a long history of problems exacerbated by foul emissions and airborne pollutants. This was due to Pierce County (the region TOTE operates in and homeports its twice-weekly 2900 nautical mile shuttles to Anchorage, Alaska by its 840 foot-long, 118-foot-wide roll-on/roll-off vessels) having the worst wood smoke particulate matter problem in the country, according to the PSCAA. Further, fine particular matter, also known as PM 2.5, is an air pollutant known to cause asthma attacks, strokes, heart attacks and cancer. Parts of Tacoma/Pierce County are in non-attainment for PM 2.5 air quality (https://www.co.pierce.wa.us/2288/Air-Quality).

Back in 2012, TOTE sought help in seeking a partnership with government agencies to recognize the significance of their taking the risk and being the first large, ocean-going cargo vessel operator in the world to commit to using LNG as a propulsion fuel. Subsequent outreach to leadership of Region 10 of

the EPA, USCG, Obama Administration, PSCAA, Maritime Administration, and others led to TOTE being able to obtain the confidence, regulatory certainty, and support to take the risk, and make the multi-millions of dollar investment to proceed with converting their relatively new vessels to LNG and to seek a production partner for the supply of LNG. In fact, TOTE's decision to convert to LNG was seen as a great breakthrough in fixing the region's air pollution problems. Not only would we gain improved environmental quality by having a large customer like TOTE use clean-burning LNG, but the placement of a LNG storage and peak-shaving facility would be a great regional asset by allowing for commercial vehicle fleets to access LNG and assure regional utility customers could have a dependable and reliant store of fuel when heating or cooling demand peaked. The potential for heavy-duty trucks using LNG once available is already being recognized in Europe as reported earlier in the year by Platts https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/022718-feature-industry-sees-bright-future-for-lng-to-fuel-europes-trucks. An example of a local small vehicle fleet using LNG was recognized by Western Washington Clean Cities in 2016 when they awarded Potelco for successfully deploying what is believed to be the first liquefied natural gas (LNG) fueled Ford F-450s in the country and first fleet operators to convert to LNG in Washington. As a result, Potelco's vehicles displaced nearly 250,000 gallons of petroleum in 2015 for their estimated 157 vehicles converted to LNG.

After many months of negotiations with regulatory agencies and LNG purveyors, TOTE settled upon a trusted partnership with Puget Sound Energy, a well-known and local energy supplier. In part, this decision was based on PSE's access to an existing LNG pipeline along the I-5 highway corridor and just miles from the intended peak-shaving/storage facility. Consequently, there is less marginal risk of methane leakage with an existing pipeline for PSE to tap into as opposed to having to construct, test, and provide regional access to a new source of LNG.

TOTE has long held a worthy reputation for being a locally-owned, responsible, and environmentally-forward thinking vessel operator. Their ORCA class vessels are widely known as being environmentally sensitive in their design –having an internal ballast water system, redundant propulsion and navigation systems, double-hulled fuel containment, and specially designed and located oil-spill response stations within the cargo holds. The two ships themselves together handle the same volume of cargo as the three ships they replaced. This is achieved at a roughly 25 percent reduction in overall consumption of fuel. Furthermore, the ORCA-class vessels can accommodate the 53-foot trailers typically used on the I-5/Alcan Highway overland truck route to Anchorage. Shifting truck trailers from making the 2400 mile land route to the 1450 sea route provides a considerable reduction in emissions emitted per metric ton of freight. This equates to roughly a 3.75 to 6.0 ratio reduction of emissions per ton/mile in the movement of freight via waterborne transportation. Additional environmental benefits include less highway congestion, asphalt oil run-off, and decreased toxic brake lining and rubber tire particles leeching into streams and navigable waters.

Ecologically-sensitive Alaskans are particularly appreciative of TOTE's contribution to assuring recyclable materials collected from Alaskans for Litter Prevention and Recycling (ALPAR) are brought to Puget Sound for proper handling as TOTE transports over 400 trailer loads of such materials southbound. They were among the first cargo operators to seek to establish shore-side electrification for their vessels to

avoid burning fossil fuel while in port and were the very first terminal operator in the region to establish an industrial rainwater garden to reduce harmful runoff from reaching the Thea Foss waterway.

Unsurprisingly, TOTE has been recognized with numerous awards for these vessels and its business practices, including the State/British Columbia Oil Spill Task Force Legacy Award, the Alaska Department of Conservation Commissioner's Pollution Prevention Award, Washington Governor's Award for Pollution Prevention and Sustainability, and the US Coast Guard's prestigious William M. Benkert Environmental Excellence Bronze Award.

In fact, TOTE's President and CEO during the decision making on whether to take on the cost and risk of converting and building the world's first LNG-propelled cargo ships, Anthony Chiarello, was honored by no less than President Barack Obama in 2014 as recipient of the White House Champion of Change award. This was presented during the Obama Presidency for his work bringing LNG to the maritime industry. According to the award pronouncement:

> "Anthony has led TOTE to build the first liquefied natural gas (LNG) powered container ships in the world; TOTE is the first maritime company in the U.S. to convert its entire fleet to natural gas. As a result of his vision and leadership, natural gas suppliers are now creating distribution networks in major U.S. ports, making gas available to all transportation modes in those markets. Natural gas powered ships will achieve emissions reductions far below even the world's most stringent regulatory standards. These emissions reductions will have long-lasting and far-reaching positive effects on the health and safety of citizens along the U.S. coastline, particularly in Washington, Alaska, Florida, and Puerto Rico where TOTE ships are part of the critical domestic supply chain. As the adoption of natural gas fuel spreads, air emissions will be lowered along the coastline as part of the North American Emissions Control Area, and additional environmental benefits will accrue in ports, on roads, and rail lines."

This 2014 statement is prophetic as numerous U.S.-flag and foreign-flag vessel operators have followed TOTE's lead by completing or beginning construction on new LNG-propelled vessels or are in the planning stages to do so. In large measure this is due to the International Maritime Organization (IMO) banning ships from using fuels with a sulfur content above 0.5 percent, compared with 3.5 percent now, unless they are equipped to clean up sulfur emissions. This will be enforced by fines levied by the IMO's member states. A small sampling of these new-builds or orders includes:

https://www.maritime-executive.com/article/cma-cgm-to-run-worlds-biggest-boxships-on-lng

https://worldmaritimenews.com/archives/262036/containerships-brings-its-ordering-tally-to-six/?uid=76698 (Containership orders)

http://www.bcferries.com/about/intermediatevessel.html (BC Ferries)

https://www.marineinsight.com/shipping-news/sanmar-shipyard-completes-mt-borgoy-worlds-first-lng-powered-tugboat/ (Tugs)

https://www.maritimepropulsion.com/news/keppel-deliver-asia-first-536783#.WuPKizmAXGg.mailto

https://www.marineinsight.com/shipping-news/carnival-corporation-to-build-worlds-first-lng-powered-cruise-ships/ (Cruise ships)

https://www.marineinsight.com/shipping-news/crowley-lays-keel-for-second-lng-powered-ship/

(Con-Ros)

https://www.workboat.com/news/bluewater/first-aloha-class-ship-delivered-to-matson/?utm_source=marketo&utm_medium=email&utm_campaign=newsletter&utm_content=newsletter&mkt_tok=eyJpIjoiT0dRMVkyVmxNVGhqWmprMSIsInQiOiJCSFArQXVGbmtQSFo3SnJ5ZWl0K3hnNHFQR2tDMTdIT042TElVb2JSXC9IbkpFbmtsNm1COE5iOEZnMGNiNUxXQmMrdVhNWnJZVjUwWlIwd3Y3ampyeTRSdUppMXpFbHRmaWY2ekpNa1A4c3ZRcnVJdW56Vk1lUmxLYlVhXC85SDh6In0%3D

(U.S.-Flag Hawaii Container Ships)

https://www.marineinsight.com/shipping-news/worlds-first-dual-fuelled-dredger-to-be-powered-by-wartsila/ (Dredgers)

https://shipandbunker.com/news/world/978499-first-ship-to-ship-lng-bunkering-at-rotterdam

(Tankers)

Furthermore, an August 2018 article in Reuters (https://www.reuters.com/article/us-shipping-fuel-lng-analysis/new-fuel-rules-push-shipowners-to-go-green-with-lng-idUSKBN1L01I8) demonstrates the gaining popularity of the use of LNG by vessel operators to address global concern regarding GHG and meet International Maritime Organization limits on sulfur content. The article notes Gibraltar, the largest bunkering port in the Mediterranean, is building an LNG facility and seeks to make available LNG bunker barges to be able to bunker the 125 ships around the world using LNG. Furthermore, the article mentions that ship certification experts DNV GL, estimates another 400 to 600 LNG capable ships are expected to be delivered by 2020. The Reuters article quotes Martin Wold, a senior consultant at DNV GL as stating, "Over the last year or so there is a growing consensus among shipowners that LNG is a reasonable next step. It is gaining traction."

According to the October 4th 2018 issue of LNG Industry, Allard Castelein, CEO Port of Rotterdam, the largest port in Europe and located in the Netherlands (Europe's lowlands and most susceptible to flooding from global warming-related flooding), said:

> "The Port of Rotterdam Authority highly values and actively supports a more sustainable transport sector. As a result of cooperation with many parties like Shell and Sovcomflot we are leading the way in this transition. Compared to other fuels, LNG offers significant benefits to local air quality and contributes to the reduction of greenhouse gasses. We welcome the Gagarin Prospect and her sister vessels to our port and look forward to many more secure and efficient LNG bunker operations."

In its promotion of marine LNG, the Port of Rotterdam is now offering seagoing vessels bunkering liquefied natural gas (LNG) in the port a ten percent discount on gross seaport dues among other LNG-related promotional efforts.

Similarly, the US Department of Transportation through its Maritime Administration (Marad) remains a steadfast advocate of the use of LNG as a marine fuel. Marad recognizes LNG as a "promising alternative marine fuel that can result in significant criteria pollutant reductions" and in the recent past "partnered with a number of organizations (including TOTE) to assess and, as appropriate, demonstrate the use of LNG for vessels." Former Maritime Administrator Paul 'Chip' Jaenichen has stated:

> "These investments accelerate the growth of alternative fuel and environmental technologies throughout the United States' maritime industry. These projects will yield data that will support future commercial investment decisions and will provide lasting benefits for our nation while helping us reduce the industry's environmental footprint,...this is how government can work to encourage technology advancement and environmental stewardship."

It would be beyond absurd for an agency dedicated to clean air emissions, in a state that fancies itself the most trade dependent in the Nation, in a county hosting the largest port in the state –which for years distinguished itself as the singular county in Washington for routinely being in non-attainment of EPA air quality standards, not to support the beneficial impact access to marine LNG has in drastically reducing criteria air pollutants while sustaining our economy and the family-wage jobs maritime commerce provides.

Furthermore, given the demonstrated direction enlightened ports and vessel operators are going to embrace LNG as a marine and transport propulsion source offering the best current and foreseeable bridge fuel alternative for world shipping, Washington and Puget Sound regulators, public policy leaders, government officials, and residents should not create barriers to its implementation and undermining its burgeoning embrace by the worldwide maritime community as a lower-carbon transition fuel. International cooperation in assuring there is a worldwide network of LNG bunkering services/facilities is what is needed for the increasing number of LNG-propelled vessels.

Having attended much of the public hearing on the DSEIS offered by PSCAA in Tacoma on October 30, 2018, I wish to share some additional comments addressing some issues raised at the event. First, more than one individual mentioned increased levels of benzene were likely to be emitted as a result of the PSE LNG facility. According to Applied Analytics, https://aai.solutions/applications/lng-liquefied-natural-gas-analysis) contaminants in natural gas which need to be removed prior to liquefaction include benzene, toluene and xylenes (BTEX). Natural gas process producers often need to comply with contractual pipeline agreements and are interested in corrosion prevention on their liquefaction equipment. Benzene, toluene and xylenes (BTEX) in pre-liquefied natural gas readily freezes at the cold temperatures required in the liquefaction process. The liquefaction equipment can become blocked or coated by these solids which would then require shut down for maintenance. As a preemptive measure, LNG producers remove BTEX from the natural gas before liquefaction. Thus it seems more likely there

would be higher levels of benzene emissions from surrounding area commercial gas stations than from the PSE facility.

The Global Warming Potential (GWP) modeling completed by the DSEIS authors, Ecology and Environment, Inc, uses a 100-year impact calculation standard. This method is described by the EPA as one primarily used in the United States as a GWP measure of the relative impact of different GHGs (https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learnwhy). Detractors of the findings of the DSEIS have claimed a briefer 20 or 25-year GWP model should have been used. The PSCAA should accept the authors' decision to use the 100-year GWP standard in their presentation of the DSEIS findings and valid conclusion.

Numerous commentators at the public hearing gave short shrift to the viability and merit of the case for LNG/methane and its increasing role as a lower-carbon transition fuel. Little acknowledgment was given by the commentators, nor is it recognized by the SDEIS authors, as to the realistic technological innovation to harnessing emissions that can be achieved by reducing methane slippage. According to the Climate and Clean Air Coalition (http://www.ccacoalition.org/en/activity/ccac-oil-gas-methane-partnership), the International Energy Agency (IEA) has identified minimizing methane emissions from upstream oil and gas production as one of five key global greenhouse gas mitigation scenarios. Referring to opportunities to limit methane slippage, the IEA notes:

> "...low-cost reductions in this area could account for nearly 15% (over 0.5 Gt CO2-eq) of the total greenhouse gas reductions needed by 2020 to keep the world on a 2-degree path. The IEA estimates that global oil and gas related methane emissions in 2015 were 76 mt, but also that it is technically possible to reduce these by roughly 75% - and by up to 50% just by implementing approaches that have no net costs, taking into account the value of the gas saved."

There is little reasonable doubt not to expect more widespread use of abatement technologies and practices as the LNG sector grows and modernizes in the near-term.

For these many reasons we urge the PSCAA to accept the findings in the DSEIS and rapidly approve the final permits needed to advance the Tacoma LNG Facility and TOTE Marine Vessel Fueling Facility to fruition and thus enhance the air quality in our region.

Thank you for this opportunity to share our views on this critical issue for the U.S.-flag maritime community.

Respectfully yours,

Richard Berkowitz
Director, Pacific Coast Operations

0445-1 23. General Support

Sailors' Union of the Pacific

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GUNNAR LUNDEBERG • PRESIDENT / SECRETARY-TREASURER

October 30, 2018

The Sailors' Union of the Pacific wishes to express our support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma, as well as in support of the Puget Sound Clean Air Agency (PSCAA) finalizing its SEIS consistent with the draft it issued on October 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

There are many stakeholders in the effort to reduce emissions, and even more moving parts involved in the actual process of doing so. In the last five years alone, the Port of Tacoma, the Port of Seattle and the Vancouver Fraser [Canada] Port Authority have created an updated Northwest Ports Clean Air Strategy with the objectives of reducing port-related air quality impacts of diesel particulate matter, reducing greenhouse gas emissions, and meeting air quality standards and objectives for the airshed. The PSCAA itself is a partner in the implementation of this effort, along with agencies including the Environmental Protection Agency (EPA).

The PSE LNG facility is one part of the task of reducing diesel emissions. LNG fuel cuts particulate matter (PM) emissions produced by ships by more than 85%. These particulates are extremely harmful to the lung health of dock workers and those in the surrounding neighborhoods. According to dock workers, they not only see the black diesel particulates floating in the air, but they breathe them in while ships (still burning diesel) are waiting to dock. Besides eliminating the PM emissions, LNG fuel also reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% and nitrogen oxide (NOx) emissions by nearly 85%. Another important environmental advantage of the utilization of LNG as a fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

Reducing these real-time emissions is a matter of social justice. Sailors & port workers should not be subjected to this polluted air just for doing their jobs. Workers across the West Coast ports have been vocal about the need to reduce these emissions in their work place, and they have played an integral role in supporting ports' efforts such as the Northwest Ports Clean Air Strategy to reduce emissions. Locating the Tacoma LNG facility within the Port of Tacoma advances the effort to reduce emissions at their source.

Beyond emissions affecting ports and immediately adjacent neighborhoods, the United States has staked out the position that vessels must control emissions when travelling America's coastlines up and down the Pacific Ocean. Annex 6 to the MARPOL Treaty, for which the EPA is the enforcing agency, requires Jones Act-flagged ships that travel near to shore to significantly reduce their emissions by using cleaner fuels. TOTE's use of fuel from Tacoma LNG to power its fast-transit, near-shore ships allows the company to substantially exceed its regulatory commitment to the EPA. By using LNG, TOTE will provide major emissions reductions benefitting public health for all communities and residents along its West Coast route, which transits nearly all of Puget Sound and ends in Anchorage, Alaska. Furthermore, US flag vessels engaged in International commerce are faced with ever increasing emission regulations in foreign ports. Vessels are consistently being called upon to be cutting edge and to be within compliance of often more stringent international standards than we face in the United States. Non-compliance with International emission reduction standards will create further disadvantages and barriers to US shipping and industry.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine result in reduced life-cycle GHG emissions."

Taking into consideration the overall reduction in greenhouse gas emissions confirmed by the draft SEIS for Tacoma LNG, and the human and environmental benefits of such reductions, I fully support PSCAA finalizing its SEPA review and granting the necessary permit(s) so this important addition to our region can be completed within its new scheduled timeframe.

The Tacoma LNG facility is a project that allows multiple stakeholders – Washington coastal communities, the Port of Tacoma, adjacent neighborhoods, PSCAA, EPA and TOTE - to affirmatively advance their interests in emissions reductions. Speaking for the US Merchant Mariners serving in the ports of the Pacific Northwest, our health and economic well-being are substantially furthered by this project's timely environmental review and permit process conclusion. Please, support the creation of sustainable, family wage jobs at the Port of Tacoma, which also improve air quality and workers health.



Brendan Bohannon

Sailors' Union of the Pacific

Seattle Branch Agent

1262-1 23. General Support

PATRIOT FIRE PROTECTION, INC.
Fire Sprinklers Save Lives!

2707 70TH Avenue East
Tacoma, WA 98424

TEL: (253) 926 2290
FAX: (253) 922.6150

November 19, 2018

RECEIVED
NOV 21 2018
Puget Sound
Clean Air Agency

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

To Whom it may concern:

I am writing to you today as a resident of Tacoma and as President of Patriot Fire Protection. Speaking for 250 of our employees here in the Northwest, we have been installing quality fire protection systems for Northwest facilities for over 25 years. Our work includes significant amounts of installed fire sprinklers and other types of similar suppression systems in over 300 million square feet of facilities throughout the region.

Patriot Fire Protection considers itself a leader in our industry, we understand and protect against varied hazards, whether storing highly combustible materials in a warehouse, fire control in a 50 story Hi-rise in Seattle, or Special Hazard protection for unique manufacturing facilities. I have watched Puget Sound Energy's attempt to build a Liquified Natural Gas (LNG) facility and TOTE Maritime's innovative and environmentally friendly initiative to convert its Alaska bound ORCA class vessels to LNG very closely after the last year. Fire Protection is not an unresolved concern.

From a Fire Safety standpoint, The National Fire Protection Association has written Standard 59A. The specific standard was written for the sole purpose of providing fire safety for "The Production, Storage, and Handling of Liquefied Natural Gas". The Origin of 59A goes back to a technical committee dealing with the risks associated with LNG, they first met in 1960. The standard has been updated over a dozen times in the last 50 years and has now been adopted into the National Fire Codes. By comparison, NFPA Standard 70 is our National Electric Code. I would urge the Puget Sound Air Agency to follow the extensive data, analysis, and engineering that has been completed. The City of Tacoma has completed an Environmental Impact Statement that includes all extensive analysis of the safety of the LNG facility. In addition, the City of Tacoma Fire Department commissioned an additional independent safety review of the facility done by Braemar, a widely respected safety firm that further evaluated the design, siting, and overall safety of the facility. The analysis concludes: "The technical review of Tacoma's LNG fire and safety systems did not reveal any fatal flaws or visible design deficiencies. Tacoma LNG

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was designed to applicable codes and standards with significant attention to detail, a perceived objective of becoming a best in class LNG Facility." Put simply, this facility is being built to the highest standards in the industry with State-of-the-art safety standards.

As a fire protection professional, it is important that we take every step to ensure the safety of the facility, but it is irresponsible to ignore data, science, engineering, and simply "shout out" false assumptions on the safety of the facility. In our day to day lives, there is nothing we do that is risk free. However, I praise the City of Tacoma for going the extra mile to seek an independent review to address safety issues of the LNG facility. Now it is time to follow the data and issue all the permits necessary to get the LNG facility operational.

Tacoma and Pierce County benefit a great deal with the construction of the LNG facility and TOTE's conversion to LNG fueled ships. We stay competitive in the world shipping market and we improve our local air and water quality. Let me close with the environmental data to date:

100% reduction in Sulphur Oxides
99% reduction in Particulate Matter
90% reduction in Nitrogen Oxides
13.5% overall reduction in greenhouse gases as outlined in your draft Supplemental Environmental Impact Statement.

Again, I would urge you to follow the data, the science, and engineering analysis. This process has gone on way too long and the delays in issuing all the appropriate permits flies in the face of the data. What will we be telling the larger community and all current and future businesses interested in innovation by providing environmental leadership if we say no after all the data and merits say yes.

Thank you for considering my comments.

Sincerely,

James Boulanger

President,
Patriot Fire Protection

1586-1 5. Regulatory Framework

From: climatefirstresponders
To: Public Comment
Subject: LNG SEIS public comment
Date: Friday, October 26, 2018 2:23:30 PM

Dear PSCAA,

The Puyallup Tribe is strongly opposed to this facility right next to their marina on the Hylebos.
Puyallup treaty rights and fishing rights need to be respected by our local government. 28 WA
tribes voted to oppose the PSE LNG. From the very beginning, the public was kept out of the loop. There was no notification to residents. Neighbors half a mile from the LNG tank proposal were not notified. As a result, SEPA only had a handful comments from the general public. The city and port have been pushing for this development and Jake Fey, state representative, created a special LNG tax break several years ago after he was contacted by a PSE lobbyist. PSE has been spending millions on political campaigns and green-washing. The city is not acting as a neutral lead agency.

Climate First Responders
Tacoma, WA 98407

From:	Sarah Cornett
To:	Public Comment
Subject:	Comment on Tacoma LNG SEIS
Date:	Wednesday, November 21, 2018 12:09:52 PM
Attachments:	PSCAA Tacoma LNG SEIS Health Professional Comments.pdf

To whom it may concern,

Please find the attached comment letter from the Washington and Oregon chapters of Physicians for Social Responsibility on the Tacoma LNG project Supplemental EIS. We welcome any questions on this letter.

Thank you,
Sarah
--
Sarah Cornett
Climate Program Organizer
Washington Physicians for Social Responsibility
Office: (206) 547-2630
Cell: (916) 340-5163
Pronouns: She/Her/Hers or They/Them/Theirs
wpsr.org

0960-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

November 20, 2018

To: Puget Sound Clean Air Agency (PSCAA)

Re: Comments on Draft SEIS for Proposed Tacoma LNG Facility

Thank you for conducting a Supplemental EIS of greenhouse gas emissions for the Tacoma LNG project. We write representing thousands of health professional members of Washington and Oregon Physicians for Social Responsibility, statewide organizations committed to protecting human health from the greatest threats we face, including climate change.

We stand with the Puyallup Tribe in asking for the most thorough and science-based review of this facility possible. We support their request, echoed by many other organizations and individuals, for a final EIS with more complete and accurate information about the true climate impacts of this project. The proposed LNG refinery, storage, and distribution facility is sited on Puyallup tribal land and is being built without their permission.

Global Warming Potential for Methane Leakage

The SEIS uses a 100-year timeline to assess methane leakage for the facility and its upstream impacts.[1] We request that the final EIS instead use the more accurate 20-year timeline, used by the United Nations Intergovernmental Panel on Climate Change.[2] While we understand that the 2007 standard is used by Washington State following the Environmental Protection Agency greenhouse gas reporting program, we ask that the final EIS utilize more up-to-date accounting based on the latest science.

0960-2 13. LCA Inputs and Assumptions - Natural Gas Source
0960-3 3. Outside of SEIS Scope

Using the 100-year timeline also incorrectly biases the analysis in favor of the project which is proposed to have a 40-year lifespan.
The climate forcing potency of methane is far greater in the short term. Using the best available science and the more recent assessment of climate impacts of methane leakage shows that the LNG project likely has a significantly greater climate impact than the “no action alternative” in PSCAA’s analysis.

Fracking in British Columbia

The SEIS asserts that the Tacoma LNG project will result in a net reduction of greenhouse gas emissions if the gas is sourced from British Columbia. It identifies the province’s regulations on the fracking and transport process as more protective than those found in the United States, in the end arguing that the gas for this facility must come from B.C. sources if the facility is to have a net benefit for greenhouse gas emissions.

As an organization of health professionals, we are concerned about any increase in demand for fracked gas and the health impacts that will have in B.C. communities. The emerging research on fracking finds that it is linked to various public health threats,[3] including air pollution that exacerbates asthma, heart disease, contributes to premature births and affects the brain and nervous system. Surface water and groundwater contamination have also become more prevalent near fracking sites and through disposal of fracking fluids. Fluid and wastewater from fracking has been found to contribute to adverse neurodevelopmental and reproductive outcomes.[4]

The construction of additional pipelines and increase in gas volume traveling through the region also raise concerns about erosion, loss of tree cover, leakage, fires, and explosions. Though the fracking may occur beyond Washington’s borders, we have a duty to consider the health and well-being of others in our region and throughout the gas supply chain.

Estimates of Methane Leakage

0960-4 14. LCA Inputs and Assumptions - Leakage/Slippage
0960-5 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0960-6 22. General Opposition

The SEIS uses conservative estimates to model methane leaks from fracking in British Columbia.[5] More recent estimates find that pipelines and wells leak as much as 6 times more than previously reported.[6] We are concerned that the SEIS significantly underestimates the true increase in greenhouse gas emissions from the project due to methane leakage at each point along the supply chain, including LNG production, delivery, and storage, from B.C. to Tacoma and beyond. It is also likely that gas will come from other areas of the US and Canada. This additional impact of methane leakage along the supply chain from other places than B.C. must be included in a proper evaluation of the impacts of this project.

GHG Impact of Supply Chain for Frack Sand and Water

Fracking requires large consumption of water and sand for its operations, some of it coming long distances to the fracking well. GHG emissions from the diesel trucks and locomotives transporting the water and sand were not included in the analysis for this draft SEIS. One gas well uses a hundred rail cars of sand for fracking. One unit-train (100+cars) plus intermediate transport by diesel truck makes a significant quantity of diesel emissions to obtain gas from one well. Many, many wells and many trucks are required to fill a tanker ship with gas. The potential leakage from this supply chain has not been estimated in the draft EIS and would contribute greatly to the GHG emissions and footprint of this project.

Net Effect on Climate Change

According to Puget Sound Energy (PSE), the proposed plant will serve future customer demand, serve as a fueling station for ships that run on natural gas, and will be used to sell LNG to other industry merchants. The proposed plant, storing 8 million gallons of fracked gas, will likely bring a commensurate increase in bunkering barge and tugboat traffic in the Hylebos and Blair Waterways. PSE also plans to use the Tacoma facility to load barges and trucks with LNG destined for other regional markets. We are concerned that the SEIS has not accounted for the full potential of these activities to contribute to greenhouse gas emissions. Although ships that run on LNG emit lower particulate

0960-7 3. Outside of SEIS Scope

matter than those that run on diesel, will the increased conventional maritime and truck traffic negate any gains the region receives in air quality from converting ship traffic from diesel to LNG? Is there sufficient commitment among shipping companies to convert from diesel to LNG, in order to realize such gains? Furthermore, it is quite troubling that this plan to use precious time and resources to replace one fossil fuel with another will not address the greater and more urgent need to develop true alternatives in a short time frame for our survival. This analysis must consider the most up to date scientific evidence and methods in estimating the climate impact of this project. It has not done so.

Health Impacts of Climate Change

As health professionals, we are especially concerned about the impact the proposed LNG plant will have on the health of Puget Sound residents, as well as residents of the Region and the Planet. Climate change poses significant health consequences, and it is our duty to speak out against projects that could drive further climate change.

Climate change impacts health in several ways. It contributes to extreme heat events and urban flooding, which pose obvious health and safety risks. In our region, climate change is causing warmer, drier summers. This means increased levels of ozone pollution, creating health risks to those with lung and heart diseases. It also means a longer and more severe wildfire season, with its damaging particle pollution in smoke, as well as loss of life and infrastructure. (Visualize the wildfires currently burning in California.) Ozone can reduce lung function, trigger asthma attacks, inflame and damage the lungs, and aggravate emphysema and bronchitis.[7] Children are the group at highest risk from ozone exposure.

The principal threat from wildfire smoke is particulate matter, and exposure can cause serious disorders, including reduced lung function, bronchitis, pneumonia, exacerbation of asthma, strokes, chronic obstructive pulmonary disease, heart failure, and premature death. Children, pregnant women, and the elderly are especially vulnerable to smoke exposure. But particulate matter can also affect healthy people, causing respiratory

symptoms, transient reductions in lung function, and pulmonary inflammation.[8,9] Particulate matter, along with other air pollutants, accounts for over 1,000 deaths per year in Washington state. If the proposed plant results in more pollution from diesel burning trucks and maritime vehicles that don't run on LNG, this will add to the particulate matter burden of the region.

Furthermore, wildfires can also hasten ecosystem changes and release large amounts of carbon dioxide into the atmosphere—contributing further to climate change.[10] Increases in the number and intensity of wildfires spurred by climate change could release enough CO2 to endanger the state's and region's progress toward meeting its greenhouse gas reduction targets.

Missing Data

The review process was reopened for a Supplemental Environmental Impact Statement to take into account the life cycle impacts of fracked/natural gas in terms of its role in climate change. The Draft Supplemental Environmental Impact Statement (SEIS) released by the Puget Sound Clean Air Agency is inadequate and needs to be reworked in light of current scientific knowledge about the impacts of methane on climate change. And, in light of current scientific evidence indicating the urgent need to take action within the next 10-12 years to curb and radically reduce the release of greenhouse gases for the survival of a habitable planet, we are greatly concerned that this project will increase the demand for, production of, and burning of fossil fuels, resulting in a greater not lesser contribution to catastrophic climate disruption. The authors of the draft SEIS, in stating that the project will reduce our local, state, or regional carbon footprint, have biased the analysis in favor of their conclusions. The current version of the draft SEIS does not contain all the information that is needed to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.

The Puget Sound Clean Air Agency has two principal goals: I) to protect public health and the environment from air pollution, and II) to become the most climate friendly region in the United States. We believe that the proposed Tacoma LNG plant, which will add to our fossil fuel infrastructure and has the potential to increase our overall greenhouse gas emissions, is incompatible with those goals. For these reasons, we request that PSCAA deny this permit.

Thank you for your attention to our concerns,

Laura Skelton, MS

Executive Director, Washington Physicians for Social Responsibility

Dr. Rejean Idzerda, PhD

Climate & Health Task Force, Washington Physicians for Social Responsibility

Sarah Cornett

Climate Program Organizer, Washington Physicians for Social Responsibility

Kelly Campbell

Executive Director, Oregon Physicians for Social Responsibility

Dr. Theodora Tsongas, PhD, MS

Healthy Climate Action Team, Oregon Physicians for Social Responsibility

Regna Merritt

Healthy Climate Program Director, Oregon Physicians for Social Responsibility

References:

[1] Proposed Tacoma Liquified Natural Gas Plant, Draft Supplemental Environmental Impact Statement. Puget Sound Clean Air Agency, October 2018. https://www.pscleanair.org/DocumentCenter/View/3482/Draft-Supplemental-EIS-Tacoma-LNG-October-8- 2018?bidId=

[2] "Summary for Policy Makers of IPCC Special Report on Global Warming of 1.5 C approved by governments." IPCC, 2018. https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml

[3] "Fracking: experimenting with our health." *Canadian Alliance of Physicians for the Environment*, 2018. https://cape.ca/wp-content/uploads/2018/02/1.Fracking-Flyer-V1-Courtney-Howard-April-2017.pdf

[4] "A systematic evaluation of chemicals in hydraulic-fracturing fluids and wastewater for reproductive and developmental toxicity," *Journal of Exposure Science and Environmental Epidemiology*, 2017. https://www.nature.com/articles/jes201581

[5] "Lifecycle assessment of natural gas production," *Stanford University Gas Initiative*, 2017. https://ngi.stanford.edu/sites/default/files/110_Brandt.pdf

[6] "Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada," *Atmospheric Chemistry and Physics* , 2017. https://www.atmos-chem-phys.net/17/12405/2017/

[7] "What You Need Need to Know About Ozone and Your Health," United States Environmental Protection Agency, 1999. https://www3.epa.gov/airnow/health/smog.pdf

[8] "Wildfire Smoke: A Guide for Public Health Officials," United States Environmental Protection Agency, 1999. https://www3.epa.gov/airnow/wildfire_may2016.pdf

[9] "Wildfire smoke and human health," Science of the Total Environment, 2018.

https://www.sciencedirect.com/science/article/pii/S004896971733512X?via%3Dihub

[10] Center for Climate and Energy Solutions, Wildfires and Climate Change, https://www.c2es.org/content/wildfires-and-climate-change/

From: Erin Dilworth
To: Public Comment
Subject: Tacoma LNG SEIS Comment
Date: Wednesday, November 21, 2018 5:02:42 PM
Attachments: CHB-LNG-CommentLetter_11-21-2018.pdf
CHB-Emissions_Calculations_11-21-2018.xlsx

Hello,

Please find attached comments on the Tacoma LNG SEIS, and supporting documentation. Please let me know if we can clarify any of our comments. Thank you.

Erin Dilworth | Policy & Technical Project Manager
Citizens for a Healthy Bay | Tacoma, WA
253-383-2429 x103

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Citizens for a Healthy Bay

535 Dock Street
Suite 213
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Phone (253) 383-2429
chb@healthybay.org
www.healthybay.org

November 21, 2018

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101
publiccomment@pscleanair.org

Re: Comments on Puget Sound Energy (PSE) Tacoma LNG Facility draft Supplemental Environmental Impact Statement (SEIS)

Executive Director
Melissa Malott

To Whom It May Concern,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG Facility SEIS.

Board of Directors
Brice Boland
Sherrie Duncan
Desiree Wilkins Finch
Bryan Flint
Barry Goldstein
Jerry Hallman
Kelly McCord
Sheri Tonn

Citizens for a Healthy Bay (CHB) is a 28-year-old organization whose mission is to represent and engage people in the cleanup, restoration, and protection of Commencement Bay, its surrounding waters and natural habitat. We are a 501(c)3 nonprofit providing practical, solutions-based environmental leadership in the Puget Sound area. We work side-by-side with residents, businesses, and government to prevent and mitigate pollution and to make our community healthier and more vibrant.

Staff and expert members of CHB's Policy and Technical Advisory Committee have reviewed the SEIS. Due to the significant amount of missing and outdated information, as well as our conclusion that this project will increase greenhouse gas (GHG) emissions, CHB is opposed to the completion of the LNG facility. We also found the SEIS to be extremely difficult to understand for lay people, which will prohibit the public from participating in this process. We ask the Puget Sound Clean Air Agency (PSCAA) to redraft the SEIS using accurate, up-to-date figures in its analysis, and reissue the SEIS for public review and comment. Our comments are outlined below, in addition to our letter dated October 26, 2018 and oral testimony from staff on October 30, 2018.

A tax-exempt
501(c)(3) Washington
nonprofit corporation

1095-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1095-2 13. LCA Inputs and Assumptions - Natural Gas Source
1095-3 7. SEPA Alternatives
1095-4 11. LCA Inputs and Assumptions - General

Background

In 2014, PSE proposed building a new LNG facility in the Tacoma Tideflats. PSE stated the project is needed to provide fuel to TOTE Maritime and other marine shipping customers to meet emissions standards and provide fuel to residential customers during times of increased energy demand. In early 2018, PSCAA determined that a SEIS was needed because the original EIS did not provide quantitative analysis of the GHG emissions from the proposed project. The SEIS serves as a life cycle assessment (LCA) of GHGs, from extraction to combustion.

Methane Gas Source and Leakage

The SEIS' conclusion that the LNG project will result in a GHG reduction hinges on the requirement that all the methane gas comes from British Columbia (BC). The SEIS assumes the BC network has less fugitive emissions because flaring is prohibited and because of their "comprehensive drilling and production regulations that reduce methane emissions." Literature shows that BC's methane leakage rate is 2.5-6 times higher than previously reported [1, 2]. The LCA assumes the leakage rate in BC to be 0.32% - this leakage rate is extremely low and needs to be raised. **The SEIS should be revised by using a 3% leakage rate, to more accurately reflect the methane leakage that happens on the ground, and then reissued for public comment [3].**

Additionally, as the latest version of the 2018 *Flaring and Venting Reduction Guideline* from the BC Oil and Gas Commission shows, methane flaring is permitted in BC [4]. **This literature should be reviewed and the SEIS should be revised to show the emissions resultant from methane flaring in BC, and then reissued for public comment.**

Alternatives Considered

The SEIS uses WAC 197-11-620(1) to justify only considering two alternatives, the proposed and no action alternatives. The WAC states, "The SEIS should not include analysis of actions, alternatives, or impacts that is in the previously prepared EIS." Consequently, the SEIS *should* have considered alternatives that were not analyzed in the prepared EIS. On page 65 of Appendix C of the SEIS, several alternatives to meet the stated need are listed: marine gasoil, exhaust scrubbers, and low-sulphur fuel oil. In addition to these alternatives, the following operational changes can be employed to decrease emissions: optimized ship trim, slow steaming, hull cleaning, enhanced network routing, and engine maintenance [5]. **The SEIS should be updated with additional alternatives that serve to meet the stated need, and then reissued for public comment.**

Extraction Method

The SEIS fails to outline how the method of natural gas extraction. As stated on page 36 of Appendix C, "GHG emissions from petroleum production depend on the crude oil type and the extraction method." The same is true for methane gas. Methane gas extraction itself has associated fugitive emissions, and can contaminate ground and surface water [6]. **The SEIS should be revised to include the methane gas extraction method, and then reissued for public comment.**

[1] Atherton et. al. (2017). Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada. *Atmospheric Chemistry and Physics, 17,* 12405–12420.
[2] Wisen et. al. (2017). *A Portrait of Oil and Gas Wellbore Leakage in Northeastern British Columbia, Canada.* Conference Paper for Geo Ottawa. Oct. 2017.
[3] Larson, K. et. al. (2015). *Untapped Potential: Reducing Global Methane Emissions from Oil and Natural Gas Systems*. Rhodium Group.
[4] BC Oil and Gas Commission. (2018). *Flaring and Venting Reduction Guideline. Version 5.1 May 2018*.
[5] Wan, A. et. al. (2018). Decarbonizing the international shipping industry: Solutions and policy recommendations. *Marine Pollution Bulletin, 126,* 428-535.
[6] Sovacool, B.K. (2014). Cornucopia or curse? Reviewing the costs and benefits of shale gas hydraulic fracturing (fracking). *Renewable and Sustainable Energy Reviews, 37,* 249-264.

1095-5 14. LCA Inputs and Assumptions - Leakage/Slippage
1095-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1095-7 14. LCA Inputs and Assumptions - Leakage/Slippage
1095-8 18. LCA Inputs and Assumptions - Marine Diesel Oil
1095-9 17. LCA Inputs and Assumptions - Peak Shaving
1095-10 19. LCA Inputs and Assumptions - End Use

Fugitive Emissions

The language in the SEIS is misleading concerning what fugitive emissions are being included in the LCA.

LNG Storage

Page 2-3 states, "The storage tank would be vapor- and liquid-tight without losses to the environment." The very following paragraph says, "GHG emissions would also occur from fugitive losses that occur from valves associated with the LNG storage tank." **This language and subsequent emissions calculations should be revised to accurately reflect the volume of fugitive emissions that occur from LNG storage, and the SEIS reissued for public comment.**

LNG Delivery to TOTE and Others

Page 2-4 states, "Fugitive GHG emissions would occur from valves and piping associated with the transfer of LNG to TOTE's ships, and from LNG loading to other marine vessels." But then goes onto say on page 2-5 "LNG bunkering of ships at the TOTE terminal would not produce any fugitive emissions." **This language and subsequent emissions calculations should be revised to accurately reflect the volume of fugitive emissions that occur from bunkering operations, and the SEIS reissued for public comment.**

Local LNG Transport

Page 30 and 31 of Appendix C states, "Since the natural gas for the Tacoma LNG project is supplied directly by a transmission pipeline, the fugitive emissions associated with transmission line will be attributed to Tacoma LNG emissions, but the local delivery or distribution portion will be estimated as zero." Fugitive methane emissions occur at every juncture between extraction and combustion [3, 6]. Fugitive emissions will result from trucking LNG from the Tacoma facility to the Gig Harbor facility, and by whatever other means are used to transport LNG. **This language and subsequent emissions calculations should be revised to accurately reflect the volume of fugitive emissions that occur from local transport operations, and the SEIS reissued for public comment.**

No Action Alternative

The description of the No Action alternative (NAA) is inaccurate, and makes the NAA seem worse than it actually is by assuming a 1:1 displacement of LNG with heavy diesel fuel (Appendix C p. 36). The described NAA does not reflect the reality of the current situation, and needs to be updated.

Peak Shaving

The NAA assumes that PSE will fuel peak shaving generators using diesel fuel, despite currently using natural gas to achieve peak shaving needs. **This language and subsequent emissions calculations should be revised to show that NAA peak shaving operations are achieved using natural gas, not diesel, and the SEIS should be reissued for public comment.**

On Road Trucking and Truck-to-Ship Bunkering

The NAA assumes all trucking is achieved with the use of diesel fuel, even though biodiesel and renewable diesel are available, as referenced on page 35 of Appendix C. What evidence supports this assumption that all associated trucking is currently achieved with heavy diesel fuel? **This language in the SEIS and subsequent emissions calculations should be revised to accurately reflect the fuel type and emissions that occur from NAA on road trucking and truck-to-ship bunkering, and the SEIS should be reissued for public comment.**

1095-11 18. LCA Inputs and Assumptions - Marine Diesel Oil
1095-12 19. LCA Inputs and Assumptions - End Use
1095-13 19. LCA Inputs and Assumptions - End Use
1095-14 17. LCA Inputs and Assumptions - Peak Shaving

Use of Marine Diesel as a Marine Fuel

The NAA assumes without LNG, all marine vessels would operate on heavy marine diesel. This is not true of the current shipping fleet. TOTE itself is currently meeting emissions standards by operating on ultra-low sulphur diesel marine gasoil [7].

Matson, another large shipping company in the Port of Tacoma, has actively removed LNG infrastructure from its new vessels, and plans on using this ultra-low sulphur gasoil to meet standards [8]. Additionally, the NAA assumes that without LNG, no marine shipping companies will adopt new fueling protocols to meet the International Maritime Organization's new emissions standards, even though they will be required to do so. **This language in the SEIS and subsequent emissions calculations should be revised to accurately reflect the fuel type and emissions that occur from NAA shipping operations, and the SEIS should be reissued for public comment.**

Proposed Alternative

The description of the proposed alternative (PA) is inaccurate, and makes the PA seem better than it actually would be by assuming a 1:1 displacement of LNG with heavy diesel fuel (Appendix C p. 36). The described PA does not reflect reality, and needs to be updated.

Use of LNG in non-TOTE Marine Vessels

The LCA assumes 46.3-69.15% of the total LNG produced will be sold to marine application customers other than TOTE, despite this assumption not being outlined in the original EIS, and despite not having any confirmed customers other than TOTE. **Because there are no other confirmed customers, the PA end use applications should be adjusted to reflect this, subsequent GHG emissions should be recalculated, and the SEIS should be reissued for public comment.**

Use of LNG in On-Road Trucks

The LCA assumes with the LNG facility in place, all on-road trucking will be fueled by LNG. The assumption that all trucks are LNG capable and ready is not reflective of reality. **Because not all associated trucks are capable or ready to run on LNG, the PA end use applications should be adjusted to reflect this, subsequent GHG emissions should be recalculated, and the SEIS should be reissued for public comment.**

Peak Shaving

The LCA assumes that LNG will be used for peak shaving needs for only 10 years, and then will "presumably [be sold] for additional marine fuel applications." (Appendix C p. 24). To stay consistent with the 1:1 displacement assumption, the NAA should show diesel being used to fuel peak shaving for the first 10 years, and then revert back to natural gas. **The PA end use applications should be adjusted to show peak shaving switching back to natural gas after 10 years, subsequent GHG emissions recalculated, and the SEIS should be reissued for public comment.**

[7] Schuler, M. (2018, February 26). " TOTE Maritime Completes 'Phase 1' of Orca-class LNG Conversions." *gCaptain.* Accessed from https://gcaptain.com/tote-maritime-completes-phase-1-of-orca-class-lng-conversions/ on November 17, 2018.
[8] *Personal communication with Matson employee – Erin Dilworth (September 6, 2018).*
[9] Anderson, M., Salo, K. & Fridell, E. (2015). Particle and gaseous emissions from an LNG powered ship. *Environmental Science & Technology, 49(20),* 12568-12575.

1095-15 14. LCA Inputs and Assumptions - Leakage/Slippage
1095-16 21. LCA Inputs and Assumptions - Additional Air Pollutants
1095-17 12. LCA Inputs and Assumptions - Global Warming Potential Value
1095-18 11. LCA Inputs and Assumptions - General

Methods

Emissions to be Reviewed

End-use emissions from use of LNG in TOTE and other marine vessels are included in the LCA. The SEIS fails to include the emissions resultant from the incomplete combustion of methane in marine engines, known as methane slip. Emissions from uncombusted methane are anywhere from 7-36g/kg LNG, depending on the engine load and combustion temperature [9]. **This language in the SEIS and subsequent emissions calculations should be updated to accurately reflect the rate of methane slip, and the SEIS should be reissued for public comment.**

GHGs used as Life Cycle Criteria

This life cycle assessment only analyzes carbon dioxide, methane and nitrous oxide. Given that the stated need of the project is a "cleaner" fuel source for marine applications, this LCA should include particulate matter, as particulate matter is both a contributor of global warming and a product of both diesel and LNG combustion [9]. **The SEIS should be updated to include particulate matter as a GHG, and then reissued for public comment.**

This LCA uses the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report as its reference for Global Warming Potential (GWP) values, despite the availability of the IPCC's more recent 2013 Fifth Assessment. Additionally, this LCA uses the 100-year GWPs for all GHGs analyzed, stating that "[t]he 100-year GWP is consistent with the time horizons for the Tacoma LNG project." This assertion is demonstrably false, as the Tacoma LNG project will only be operational for 40 years, and methane, the primary component of LNG, is 85-times more potent than carbon dioxide in the first 20-years after it is emitted [10]. Using the 100-year GWP obscures the real climate change impacts of this project by effectively smoothing the rate of global warming over a longer period of time. When the 20-year GWPs from the 2013 report are used to calculate the GHG emissions from scenarios A and B, the LNG project produces 307,825.60 - 666,975.32 more tons of GHG emissions per year, compared to the NAA (see attached Excel file). **The SEIS should be updated using the 20-year GWPs from the 2013 IPCC report, and then reissued for public comment.**

Cut Off Criteria

Emissions that represent less than 1% of the total GHG emissions from well to combustion are excluded from this LCA. The choice to exclude these emissions was not justified with peer-reviewed guidelines or research - this decision requires justification, which should be included as a reference in the SEIS. Additionally, these smaller sources of emissions should be included in the LCA, as multiple small sources of emissions that are excluded could add up to a big impact. Especially since the SEIS touts such a small GHG benefit, smaller emission sources from the proposed alternative should be included, as they could flip the SEIS' conclusion. **The SEIS should be updated with credible references that justify the cut off criteria and should include emission sources less than 1% of the total in the LCA, and then should be reissued for public comment.**

Analysis

Carbon Content of LNG

Both pages 71 and 74 of Appendix C state, "Note that the emissions from the LNG facility plus upstream emissions are higher than those or the no action alternative. However, the carbon content of LNG results in lower end use emissions; so, the net life cycle GHG emissions are reduced under most circumstances." Page 117 of Appendix C shows "placeholder values" being used for the fuel properties of natural gas, which would then be used to calculate the fuel properties - including the carbon content - of LNG. It is completely unacceptable to

[10] IPCC (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

1095-19 15. LCA Inputs and Assumptions - Natural Gas Properties

release a LCA that uses placeholder values, especially for the components of the analysis that are responsible for "result[ing] in lower end use emissions." Further, page 88 of Appendix C shows that the values of direct emissions from the LNG facility operation "are representative and actual data have been requested." This LCA is not complete until accurate data on the fuel properties of the natural gas to be used have been attained and incorporated into the analysis. Furthermore, what are the circumstances under which the end use emissions from LNG do not result in a net reduction of GHGs? These scenarios need to be fully described to allow for complete and transparent review from the public. **The SEIS should be revised by using accurate fuel property data of the natural gas, and then reissued for public comment.**

Due to the significant amount of missing and outdated information, as well as our conclusion that this project will increase GHG emissions, CHB is opposed to the completion of the LNG facility. We ask PSCAA to redraft the SEIS using accurate, up-to-date figures in its analysis, and reissue the SEIS for public review and comment. Please contact me if there are questions regarding my comments. Thank you for the opportunity to provide feedback on the Tacoma LNG SEIS.

Sincerely,



Melissa Malott
Executive Director, Citizens for a Healthy Bay
mmalott@healthybay.org, (253) 383-2429

Scenario A

	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)
Construction Emissions (Project TOTAL)			
Direct (Equipment)	7,264.52	0.12	0.07
Upstream Life Cycle (Equipment)	795.04	0.63	0.00
Upstream Life Cycle (Power)	2,146.55	4.10	0.04
Upstream Life Cycle (Material)	51,553.11	50.32	0.19
Operational Emissions (ANNUAL)			
Natural Gas	40,648.87	1,432.51	2.50
Power LNG production	24,429.47	46.66	0.48
Diesel Emergency	139.44	0.14	0.00
Power LNG Vaporizer -Peak Shaving	815.52	1.56	0.02
Gig harbor Diesel truck fuel	0.00	0.00	0.00
LNG Production	46,406.35	4.52	0.65
Vaporizer -On-site Peak Shaving	939.79	0.02	0.01
Marine vessel bunkering, truck CH4	0	183.80	0
On-site Peak Shaving	43,755.48	0.80	0.26
Gig harbor LNG	0.00	0.00	0.00
On-road Trucking	0.00	0.00	0.00
TOTE Marine	171,718.03	2,028.76	11.93
TOTE Marine Diesel Pilot fuel	7,508.25	0.11	0.34
Truck-to-Ship Bunkering	0.00	0.00	0.00
Truck-to-Ship Bunkering Pilot Fuel	0.00	0.00	0.00
Other Marine LNG (by Bunker Barge)	185,541.24	2,192.07	12.89
Other Marine Diesel Pilot Fuel	8,112.66	0.11	0.34
TOTAL	**591,774.33**	**5,946.23**	**29.73**
TOTAL w/o Construction Emissions	530,015.11	5,891.06	29.42
Total Annual Emissions (including construction)	531,559.09	5,892.44	29.43
TOTAL PER YEAR EMISSIONS	531,559.09	5,892.44	29.43
LIFE OF PROJECT EMISSIONS	21,262,363.61	235,697.63	1,177.09
TOTAL PER YEAR EMISSIONS USING 20-YR AR5	531,559.09	500,857.47	7,768.77
LIFE OF PROJECT EMISSIONS USING 20-YR AR5	21,262,363.61	20,034,298.80	310,750.97

	AR5 GWP	
Time Horizon	100	20
CO2	1	1

CH4	30	85
N2O	265	264

CO_2e (tonne/ year)		
7,289.50		
812.10		
2,261.57		
52,868.82		
	Enduse LNG	
77,207.97	88.75	
25,738.51		
143.25		
859.22		
0.00		
46,713.84		
941.86		
4,595.07		
43,853.64		
0.00		
0.00		
225,992.87		
7,611.40		
0.00		
0.00		
244,185.18		
8,215.81		
749,290.60		
686,058.61		
687,639.41		
687,639.41		Matches SEIS
27,505,576.36		Matches SEIS
1,040,185.33		
41,607,413.38		
		ANNUAL EMISSIONS (tonne/year)
		Scenario A Emissions
		No Action Emissions
AR4 GWP		Increase in Emissions
100 20		% Increase
1 1		

25 72
298 289

Construction Emissions (divided by 40 years)	**CO_2** (tonne/ year)	**CH_4** (tonne/ year)	**N_2O** (tonne/ year)	**CO_2e** (tonne/ year)
Direct (Equipment)	181.61	0.00	0.00	182.24
Upstream Life Cycle (Equipment)	19.88	0.02	0.00	20.30
Upstream Life Cycle (Power)	53.66	0.10	0.00	56.54
Upstream Life Cycle (Material)	1,288.83	1.26	0.00	1,321.72

	Cars
1,040,185.33	226,127.25
732,359.74	159,208.64
307,825.60	
30%	

No Action Alternative - Scenario A

	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)
Upstream Displaced Emissions			
No Peak Shaving - Diesel Dual Fuel	15,698.53	16.00	0.11
Upstream Gig harbor Peak Shaving	0.00	0.00	0.00
Upstream On-road trucking	0.00	0.00	0.00
Upstream TOTE Marine Diesel	51,531.16	33.71	0.25
Upstream Truck-to-Ship Bunkering	0.00	0.00	0.00
Upstream Other Marine Diesel (by Bunker Barge)	55,679.39	36.42	0.27
End Use Emissions			
Diesel Peak Shaving for Power	58,681.50	0.15	0.69
Gig harbor LNG	0.00	0.00	0.00
On-road Trucking	0.00	0.00	0.00
TOTE Marine Diesel	257,783.37	3.94	11.55
Truck-to-Ship Bunkering	0.00	0.00	0.00
Other Marine Diesel (by Bunker Barge)	278,534.79	3.94	11.55
TOTAL PER YEAR EMISSIONS	**717,908.73**	**94.16**	**24.42**
LIFETIME OF PROJECT EMISSIONS	28,716,349.17	3,766.45	976.86

TOTAL PER YEAR EMISSIONS USING 20-YR AR5	717,908.73	8,003.70	6,447.31
LIFE OF PROJECT EMISSIONS USING 20-YR AR5	28,716,349.17	320,147.99	257,892.24

	AR5 GWP	
Time Horizon	100	20
CO2	1	1
CH4	30	85
N2O	265	264

CO_2e (tonne/ year)	Double-Checked	Notes
16,127.18	1	Upstream_G65*D45/1000+Upstream_H136
0.00	1	Upstream_H138+Upstream_H137
0.00	1	Upstream_H139
52,447.90	1	Upstream_H140
0.00	1	Upstream_H141
56,669.93	1	Upstream_H142
58,890.50	1	Direct End Use_H49
0.00	1	Direct End Use_H52+Direct End Use E54
0.00	1	Direct End Use_H57
261,324.63	1	Direct End Use_H61
0.00	1	Direct End Use_H66
282,076.05	1	Direct End Use_H70
727,536.18		
29,101,447.24		

732,359.74

29,294,389.40

AR4 GWP	
100	20
1	1
25	72
298	289

Scenario B

	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)
Construction Emissions (Project TOTAL)			
Direct (Equipment)	7,264.52	0.12	0.07
Upstream Life Cycle (Equipment)	795.04	0.63	0.00
Upstream Life Cycle (Power)	2,146.55	4.10	0.04
Upstream Life Cycle (Material)	51,553.11	50.32	0.19
Operational Emissions (ANNUAL)			
Natural Gas	81,297.74	2,865.02	5.01
Power LNG production	48,858.93	93.32	0.96
Diesel Emergency	139.44	0.14	0.00
Power LNG Vaporizer -Peak Shaving	1,631.05	3.12	0.03
Gig harbor Diesel truck fuel	1.12	0.00	0.00
LNG Production	93,712.37	9.03	1.32
Vaporizer -On-site Peak Shaving	939.79	0.02	0.01
Marine vessel bunkering, truck CH4	0.00	548.89	0.00
On-site Peak Shaving	43,755.48	0.80	0.26
Gig harbor LNG	8,125.30	0.15	0.05
On-road Trucking	15,738.25	84.85	0.01
TOTE Marine	171,718.03	2,028.76	11.93
TOTE Marine Diesel Pilot fuel	7,508.25	0.11	0.34
Truck-to-Ship Bunkering	8,035.52	94.94	0.56
Truck-to-Ship Bunkering Pilot Fuel	351.35	0.01	0.02
Other Marine LNG (by Bunker Barge)	554,207.71	6,547.68	38.51
Other Marine Diesel Pilot Fuel	24,232.35	0.11	0.34
TOTAL	**1,122,011.89**	**12,332.10**	**59.65**
TOTAL w/o Construction Emissions	1,060,252.67	12,276.93	59.34
Total Annual Emissions (including construction)	1,061,796.65	12,278.30	59.35

TOTAL PER YEAR EMISSIONS	1,061,796.65	12,278.30	59.35
LIFE OF PROJECT EMISSIONS	42,471,866.16	491,132.20	2,373.84
TOTAL PER YEAR EMISSIONS USING 20-YR AR5	1,061,796.65	1,043,655.92	15,667.37
LIFE OF PROJECT EMISSIONS USING 20-YR AR5	42,471,866.16	41,746,236.65	626,694.87

	AR5 GWP	
Time Horizon	100	20
CO2	1	1
CH4	30	85
N2O	265	264

CO_2e (tonne/ year)
7,289.50
812.10
2,261.57
52,868.82
154,415.94
51,477.03
143.25
1,718.45
1.15
94,332.58
941.86
13,722.34
43,853.64
8,143.21
17,862.04
225,992.87
7,611.40
10,575.31
356.17
729,375.89
24,335.50
1,448,090.60
1,384,858.62
1,386,439.42
1,386,439.42
55,457,576.63
2,121,119.94
84,844,797.68

	Enduse LNG
	177.50

ANNUAL EMISSIONS (tonnes/year)	
Scenario B Emissions	2,121,119.94
No Action Emissions	1,454,144.62
Increase in Emissions	666,975.32
% Increase	**31%**

AR4 GWP	
100	20
1	1
25	72
298	289

Construction Emissions (divided by 40 years)	CO2 (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)
Direct (Equipment)	181.61	0.00	0.00
Upstream Life Cycle (Equipment)	19.88	0.02	0.00
Upstream Life Cycle (Power)	53.66	0.10	0.00
Upstream Life Cycle (Material)	1,288.83	1.26	0.00

CO2e (tonne/ year)
182.24
20.30
56.54
1,321.72

No Action Alternative - Scenario A

	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)
Upstream Displaced Emissions			
No Peak Shaving - Diesel Dual Fuel	15,698.53	16.00	0.11
Upstream Gig harbor Peak Shaving	1,632.11	21.45	0.02
Upstream On-road trucking	5,156.45	5.20	0.04
Upstream TOTE Marine Diesel	51,531.16	33.71	0.25
Upstream Truck-to-Ship Bunkering	2,411.39	1.58	0.01
Upstream Other Marine Diesel (by Bunker Barge)	166,313.14	108.79	0.80
End Use Emissions			
Diesel Peak Shaving for Power	58,681.50	0.15	0.69
Gig harbor LNG	8,168.38	0.15	0.05
On-road Trucking	19,273.78	1.17	0.04
TOTE Marine Diesel	257,783.37	3.94	11.55
Truck-to-Ship Bunkering	12,062.94	0.18	0.54
Other Marine Diesel (by Bunker Barge)	831,977.44	3.94	11.55
TOTAL PER YEAR EMISSIONS	**1,430,690.19**	**196.26**	**25.65**
LIFETIME OF PROJECT EMISSIONS	57,227,607.43	7,850.49	1,026.08
TOTAL PER YEAR EMISSIONS USING 20-YR AR5	1,430,690.19	16,682.29	6,772.15
LIFE OF PROJECT EMISSIONS USING 20-YR AR5	57,227,607.43	667,291.47	270,886.05

	AR5 GWP	
Time Horizon	100	20
CO2	1	1
CH4	30	85
N2O	265	264

CO_2e (tonne/ year)	Double-Checked	Notes	
16,127.18	1	Upstream_G65*D45/1000+Upstream_H136	
2,173.67	1	Upstream_H138+Upstream_H137	1620.589
5,297.15	1.00	Upstream_H139	11.52534
52,447.90	1.00	Upstream_H140	
2,454.29	1.00	Upstream_H141	
169,271.87	1.00	Upstream_H142	
58,890.50	1.00	Direct End Use_H49	
8,186.38	1.00	Direct End Use_H52+Direct End Use E54	43.07942
19,315.93	1.00	Direct End Use_H57	8125.297
261,324.63	1.00	Direct End Use_H61	
12,228.65	1.00	Direct End Use_H66	
835,518.70	1.00	Direct End Use_H70	
1,443,236.84			
57,729,473.78			

1,454,144.62

58,165,784.95

AR4 GWP

100	20
1	1
25	72
298	289

21.43456	0.018049	2161.831
0.011633	7.94E-05	11.83982

0.002617	9.65E-05	43.17362
0.145168	0.047933	8143.21

From: Anna Doty
To: Public Comment
Cc: Rebecca Ponzio
Subject: Washington Environmental Council Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 4:38:39 PM
Attachments: WEC_Comment to PSCAA_LNG_DSEIS.pdf

Hello,

Please see the attached comments from Washington Environmental Council on the DSEIS for the PSE LNG project.

We appreciate your consideration and the opportunity to provide comment. If you have questions or would like additional detail related to any of our comments, please contact me and I will either answer your question or put you in touch with the relevant policy expert.

Sincerely,
Anna

Anna Doty • Fossil Fuel Campaign Manager
206.631.2605 • cell 650.533.9286 • anna@wecprotects.org
Pronouns: she/her

Washington Environmental Council • wecprotects.org
1402 Third Avenue | Suite 1400 | Seattle, WA 98101

0956-1 13. LCA Inputs and Assumptions - Natural Gas Source
0956-2 14. LCA Inputs and Assumptions - Leakage/Slippage

November 20, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Dear Puget Sound Clean Air Agency,

Thank you for providing a public comment period and process for input into the draft Supplemental Environmental Impact Statement (SEIS) for greenhouse gas emissions on Puget Sound Energy's liquefied natural gas facility at the Port of Tacoma.

We appreciate the opportunity to provide comment and the work that PSCAA has done thus far to evaluate the environmental impacts of this project. However, we are concerned that the analysis in the draft SEIS inaccurately and inadequately accounts for the GHG emissions associated with this proposal. At this point, the project has not been properly evaluated and there is a lack of a comprehensive review of impacts associated with climate pollution, safety, and the environment, as well as an incomplete process, including consultation with the Puyallup Tribe. Unless these evaluations and processes are completed, this project should not move forward. We support the position of the Puyallup Tribe that calls for a new and comprehensive EIS.

Among our key concerns are that the draft SEIS relies on incorrect assumptions, does not properly consider a range of scenarios, and does not use the best available science in accounting for the possible GHG emissions of the proposed LNG facility. We request that PSCAA address the following concerns in conducting a new analysis:

The assumption that all gas supplying this facility will come from British Columbia is inappropriate. The draft SEIS analysis assumes that the gas for the facility will be sourced exclusively from British Columbia. Not only is this assumption inadequate in accounting for the range of possible GHG emission scenarios associated with this facility, it is not even reflective of PSE's current gas supply. PSE's own 2017 filing with the Security and Exchange Commission (SEC) indicates that in 2017 it purchased gas for its gas customers from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).[1] An updated SEIS should consider a full range of possible gas supplies and associated emission and leakage rates.

The draft SEIS does not use the best available science for leakage rates. In addition to inappropriately assuming constant and exclusive gas supply from British Columbia, the draft SEIS does not incorporate the most recent, peer-reviewed science indicating that both B.C. and U.S. methane leakage rates are severely underreported.[2][3] The draft SEIS should include new scenarios that reflect the likely and possible gas supply mix for the facility and account for the range of leakage rates and emissions associated with these

[1] Puget Sound Energy, Inc. 2018. Annual Report Pursuant to Section 13 of 15(d) of the Securities Exchange Act of 1934: For Fiscal year ended December 31, 2017. https://pugetenergy.com/SECfilings/PE%20-12.31.2017-10K%20Final.pdf
[2] Alvarez, et al. 2018. Assessment of methane emissions from the U.S. oil and gas supply chain. *Science*, eaar7204. http://science.sciencemag.org/content/early/2018/06/20/science.aar7204/tab-pdf
[3] Atherton, et al. 2017. Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada. *Atmospheric Chemistry and Physics.* https://www.atmos-chem-phys.net/17/12405/2017/acp-17-12405-2017.pdf

0956-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
0956-4 6. Purpose and Need
0956-5 17. LCA Inputs and Assumptions - Peak Shaving

different sources. In order to understand the environmental impact of this proposal, PSCAA should use this best available science and use more conservative leakage rate estimates.

The draft SEIS does not accurately evaluate the global warming potential (GWP) of the proposal. The draft SEIS uses a 100-year timescale for global warming potential (GWP) to analyze the proposed LNG facility. However, this timescale discounts the near-term warming impact of shorter-lived climate pollutants, such as methane, which is 84-87 times more powerful a warming agent than carbon dioxide over a 20 year period.[4] Because the emissions associated with the proposed facility are primarily methane and because the facility will only be operational for 40 years, a 20-year GWP timescale would more accurately account for the climate impact of the project. Furthermore, the most recent IPCC report affirms near-term emission reductions are the most critical factor in avoiding the most catastrophic impacts of climate change.[5] Analyzing methane at its 100-year potency minimizes the impact of methane on our climate, makes the LNG proposal appear cleaner than business as usual, and does not prioritize near-term emissions reductions when scientific-consensus affirms we need them most. Finally, the analysis does not apply the IPCC's Fifth Assessment Report that has the most up to date estimates and should be used as the best available science.

PSE has not demonstrated adequate demand for this project. The assumed GHG benefits of the project identified in the draft SEIS rely on a significant conversion of marine shipping customers to LNG. However, PSE has not demonstrated the need for a project of this scale. The conclusion that PSE LNG will produce GHG benefits relies partly on the assumption that marine shipping companies other than TOTE will utilize between about 50-70% of the LNG produced, by volume. One stated need for the conversion to LNG is the new emissions requirements established by the North American Emission Control Area (ECA). However, there are other mechanisms for meeting these standards, both technological and operational, and in fact TOTE is already in compliance with these rules. PSE has not demonstrated their ability to secure these contracts nor demonstrated a clear demand from the marine shipping industry. The draft SEIS does not consider GHG and air quality impacts in the absence of PSE's fulfillment of additional marine transportation fuel contracts and the subsequent application of this gas toward other uses, including electricity generation. Until end-users are identified, the GHG impact of this project cannot be accurately assessed. This uncertainty must be accounted for in the scenarios presented in the SEIS.

The draft SEIS does not consider a range of possible scenarios for meeting the stated "peak shaving" needs identified by PSE. Without clear limits to the use of LNG for electricity generation, the GHG impacts or benefits of this project cannot be fully accounted for. The proposed LNG facility allows PSE to regasify LNG for electricity generation. The draft SEIS considers 250,000 gpd and 500,000 gpd scenarios in which end use share of end-product LNG expected to go toward "peak shaving" is 11% and 5.48%, respectively. The draft SEIS finds the combustion of regasified LNG for "peak shaving" will produce a net benefit in GHG emissions from this project. The assertion that this component of the project will produce GHG benefits relies on the assumptions that PSE has accurately forecasted future "peak shaving" needs in its service territory and that, in the absence of available regasified LNG, this need will be addressed exclusively through the use of diesel fuel. A proper evaluation of this project should consider the full range of options available to PSE for load management. Furthermore, the draft SEIS assumption that no more

[4] US EPA. 2018. Understanding Global Warming Potentials. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why
[5] IPCC, 2018: Global warming of 1.5°C. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, Y. Chen, S. Connors, M. Gomis, E. Lonnoy, J. B. R. Matthews, W. Moufouma-Okia, C. Péan, R. Pidcock, N. Reay, M. Tignor, T. Waterfield, X. Zhou (eds.)]. In Press.

than 9.73 MGal/year of LNG will be used for electricity generation is not enforceable. As part of the analysis, the SEIS should consider other methods available to PSE for load management and "peak shaving" and evaluate the impact of additional regasification of LNG for electricity generation in the absence of other end-use customers.

PSCAA must conduct full and comprehensive consultation with the Puyallup Tribe. The Puyallup Tribe of Indians has cited a lack of adequate government-to government consultation, as required by law, regarding the environmental and public safety risks posed by the LNG facility. We support the position of the Puyallup Tribe that calls for a new and comprehensive EIS, with full government-to-government consultation.

In summary, we appreciate your consideration and commitment to evaluating the full environmental impacts of this project. Unless the environmental impacts of this proposal are fully evaluated, understood, and addressed, this project should not move forward.

Sincerely,

Rebecca Ponzio
Climate and Fossil Fuel Program Director
Washington Environmental Council

1954-1 23. General Support

From: Jessica Gamble
To: Public Comment
Subject: Comment for Tonight
Date: Tuesday, October 30, 2018 6:02:16 PM
Attachments: PSCAA Letter from MBA.pdf

See attached. Thank you!

Jessie Gamble
Government Affairs Director
3711 Center Street / Tacoma, Washington 98409
Direct (253) 254-0083
Office (253) 272-2112, Ext 103
jgamble@mbapierce.com / www.mbapierce.com
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SAVE $$-Put your membership to work now. Money saving discounts that benefit your business, your employees and your family. **Go to www.nahb.org/MA**

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MASTER BUILDERS

To the Members of the Puget Sound Clean Air Agency,

I write on behalf of the Master Builders Association of Pierce County to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone, land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate

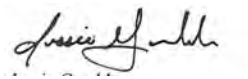
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MASTER BUILDERS

emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Always,



Jessie Gamble
Government Affairs Director

3711 CENTER STREET. TACOMA, WA 98408
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Steve: Thank you. Next is Bret Stein. Dave Gering?

Dave: Yeah, thank you. My name is Dave Gering. I'm the executive director of the Manufacturing Industrial Council of Seattle. I wanted to mention something we haven't talked about tonight.

[05:15:00] There's more than a half million people who live in Alaska. They'll all wake up tomorrow morning, and most of them are going to be hungry for breakfast. Around lunch time, they're all going to want a lunch. And around evening time, they're all going to want dinner. And almost all of the food and the other consumer products that they get are going to wind up coming from our state. A huge proportion of those are actually shipped up there by TOTE and other companies like that. Somehow, they've got to get that food. At some point, this decision is about what's the best way for them to get it, in terms of that plant.

And most of the information I'm aware of that's before you says that we're better off environmentally, if that is carried on a ship driven by natural gas. If you were trying to serve that market with trucks, the environmental impact would be far, far greater than it is today. As you know, and you've heard, if you serve it with diesel, you're going to have a bigger impact on the environment that way. So, the urgency – and I really am glad that I came down here tonight and had a chance to sort of hear everybody out.

[05:16:02] The urgency that is being called for here drives the decision to natural gas. It's all incremental. In a way, we're all Alaskans. None of us here are self-sufficient. We're all getting our food, our clothing, everything from distant sources all over the place. And we're going to have to make these incremental changes to make that system better. Everything that I've read about this plant says that's going to accomplish that small good. It won't fix all of the problems that we've talked about today. And many of them are legitimate.

But it's one step forward that's positive that's supported, in my view, by your records. So, we would urge you to issue the permit. Thank you.

1948-1 23. General Support

From: Dave Gering
To: Public Comment
Subject: Approve Tacoma LNG
Date: Sunday, November 18, 2018 8:02:18 PM
Attachments: Approve Tacoma LNG .pdf

Please approve permits for Tacoma LNG facility.

MANUFACTURING INDUSTRIAL COUNCIL

MIC Executive Committee

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Industry Space
Co-chair

Kathleen Goodman
Wood PLC
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NUCOR Steel

John Odland
MacMillan-Piper

Jordan Royer
Pacific Merchant
Shipping Association

Doug Dixon
Pacific Fishermen
Shipyard

November 19, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

The Manufacturing Industrial Council of Seattle urges the Puget Sound Clean Air Agency (PSCAA) to issue the permits required for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The draft SEIS clearly documents the local environmental and public health benefits of the proposed LNG facility. Regional benefits will also be achieved as a cleaner fuel source becomes available to power the supply chain that's required to meet essential consumer needs in Alaska.

Please approve the permits required to move the project forward.

Sincerely,



Dave Gering, Executive Director
Manufacturing Industrial Council of Seattle

1223-1 22. General Opposition

[00:44:04]

Carole: Thank you. Steven Gilbert?

Steven: Thank you. I'd first like to take a second to thank the tribes for stewarding the land and the Salish Sea. Everything about the future generations that I think we're all here to protect. I am Steven Gilbert. I am director of the Institute for Neurotoxicology and Neurologic Disorder, PhD in toxicology. And I'm a full professor at University of Washington School of Public Health. And I wrote a book called *A Small Dose of Toxicology*, which is free on the internet, and you're welcome to download the book. And I have two granddaughters that I care a lot about. And I think we need to be thinking about future generations of health.

The previous speaker gave a great litany of all of the issues and health problems associated with what's going on here.

[00:45:00] The point I want to make is that we need to move away from the polluting economy. We have repeatedly gone after easy to get resources and trying to make money off of them. We need to stop this. We need to move away from the current based economy and, with that, move away from polluting economy that we've been on for so long. One thing I learned as a toxicologist is a small amount of something can make a big difference. To start with, methane is a big difference than carbon dioxide. We need to really look at the methane, the 90% increased and problem compared to carbon dioxide.

One thing I learned as a toxicologist is that small amounts are important, and also, we know so much about so many things. We need to make good decisions. And we need to help protect the decisions. The decisions that guard our children, not just our children, but also children of the orcas**,** the salmon.

[00:46:00] We need to be thinking of the lifecycle and the lifecycle is about fracking and the pipelines that are developed and everything that is associated with it. It's not just the use of LNG here in Tacoma, but it's the whole process of getting the fracked gas together and shipping it down here. So, with that, thank you very much. And please, think about your children and grandchildren, and think about the future of the globe. These are global issues. Thank you very much.

0724-1 23. General Support







Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma. This letter reflects my comments in support of the Puget Sound Clean Air Agency (PSCAA) finalizing its SEIS consistent with the draft it issued on October 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

There are many stakeholders in the effort to reduce emissions, and even more moving parts to the actual process of doing so. In the last five years alone, the Port of Tacoma, the Port of Seattle and the Vancouver Fraser [Canada] Port Authority have created an updated Northwest Ports Clean Air Strategy with the objectives of reducing port-related air quality impacts of diesel particulate matter, reducing greenhouse gas emissions, and helping meet air quality standards and objectives for the airshed. The PSCAA itself is a partner in the implementation of this effort, along with agencies including the Environmental Protection Agency (EPA).

The PSE LNG facility is one part of the task of reducing diesel emissions. LNG fuel cuts particulate matter (PM) emissions produced by ships by more than 85%. These particulates are extremely harmful to the lung health of dock workers and those in the surrounding neighborhoods. According to dock workers, they not only see the black diesel particulates floating in the air, but they breathe them in as well while ships (still burning diesel) are waiting to dock. Besides eliminating the PM emissions, LNG fuel also reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% and nitrogen oxide (NOx) emissions by nearly 85%. Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

Reducing these real-time emissions is a matter of social justice. Port workers should not be subjected to this polluted air just for doing their jobs. Workers all across the West Coast ports have been vocal about the need to reduce these emissions in their work place, and they have played an integral role in supporting ports' efforts such as the Northwest Ports Clean Air Strategy to reduce emissions. Locating the Tacoma LNG facility within the Port of Tacoma advances the effort to reduce emissions at their source.

Beyond emissions affecting ports and immediately adjacent neighborhoods, the United States has staked out the position that vessels must control emissions when traveling America's coastlines up and down the Pacific Ocean. Annex 6 to the MARPOL Treaty, for which the EPA is the enforcing agency, requires Jones Act-flagged ships that travel near to shore to significantly reduce their emissions by using cleaner fuels. TOTE's use of fuel from Tacoma LNG to power its fast-transit, near-shore ships allows the company to substantially exceed its regulatory commitment to the EPA. By using LNG, TOTE will provide major emissions reductions benefiting public health for all communities and residents along its West Coast route, which transits nearly all of Puget Sound and ends in Anchorage, Alaska.

The Tacoma LNG facility is a project that allows multiple stakeholders – coastal communities, the Port of Tacoma, adjacent neighborhoods, PSCAA, EPA and TOTE - to affirmatively advance their interests in emissions reductions. Speaking for the dock and port workers, both our health and economic well-being are furthered by wrapping up this project's environmental review and permit effort promptly without

undue delay. Please, let's keep those good, family wage jobs at the Port of Tacoma and make the air the workers breathe healthier.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Taking into consideration the overall reduction in greenhouse gas emissions confirmed by the draft SEIS for Tacoma LNG, and the human and environmental benefits of such reductions, I fully support PSCAA finalizing its SEPA review and granting the necessary permit(s) so this important addition to our region can be completed within its new scheduled time frame.

Nicole Grant
Executive Secretary-Tresurer
MLK Labor

Patty Rose
Executive Secretary-Tresurer
Pierce County Central Labor Council

0980-1 23. General Support

From: Tyler Edgar
To: Public Comment
Subject: TOTE Maritime Alaska Public Comment
Date: Wednesday, November 21, 2018 12:30:52 PM
Attachments: TMAK (Grace Greene) Comments to PSCAA.pdf

Hi –
Please find attached a letter from Grace Greene's comments regarding the DSEIS on PSE's LNG facility.
Thank you and happy Thanksgiving.

Tyler

Tyler Edgar | Senior Manager of Marketing and Communications | **TOTE**
32001 32nd Ave. S., Suite 200, Federal Way, WA 98001 | 253.802.6479 | www.toteinc.com
-
-

Puget Sound Clean Air Agency
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101
publicomment@pscleanair.org or FAX: 206-343-7522

To the Puget Sound Clean Air Agency:

Great Land and *Westward Venture* are the names of the ships that comprised two-thirds of TOTE Maritime Alaska's original fleet in its service between Tacoma and Alaska, starting June 4, 1976. Forty years ago, TOTE chose Tacoma for its outstanding longshoremen and the ability to exceed expectations for cargo service between Puget Sound and Anchorage. Our commitment to Tacoma and this community has grown and together, we have prospered. Today, our 120-person workforce may seem small among the corporate giants of this region, but our economic impact is substantial. We provide a cargo lifeline between the lower 48 and Alaska, sailing 2900 miles across the Gulf of Alaska every week. Folks in this area have grown so accustomed to ships in Puget Sound, they've become a key fixture of the landscape. Those ships represent goods made, sold and destined for – or from – around the globe. At TOTE, we consider it a privilege to be in Tacoma.

Our commitment to the community is why retrofitting our vessels to run on liquefied natural gas (LNG) is an imperative for our company, and the pursuit of cleaner air at the Port of Tacoma is a step in the right direction for us all.

For TOTE, our obligation to this community is reflected in how we integrate local values into our daily operations. We make improvements everywhere we can to be cleaner and more responsible to the environment around us. Our track record proves it. In 2010, we were the first to install rain gardens at the Port of Tacoma which prevents 250,000 gallons of run-off from entering Commencement Bay each year. The year before, we began "cold ironing" at the Port of Tacoma, which means we plug in to power sources on shore to prevent emissions caused by "idling" ships. Cold ironing reduces carbon dioxide emissions by 1,360 tons and diesel particulates by 1.9 tons annually. Additional emissions reductions will come from converting our Orca class vessels to run on LNG. LNG is the best, commercially-available fuel for TOTE in its efforts to reduce emissions. Using LNG will result in significant reductions in particulate matter, SOx, NOx and carbon dioxide. We have already made the conversion in Jacksonville, Florida, where our ships run between the Port of Jacksonville and Puerto Rico and are powered by LNG. We do not take the commitment to care for the environment and the communities we serve lightly and we have not hesitated to invest in these improvements.

This decision to convert to LNG was not made without careful consideration, and while it reflects our environmental values, it is not an entirely altruistic decision. Environmental standards driving

the use of LNG for maritime use are developed by the United Nation's International Maritime Organization and further shaped by the Environmental Protection Agency. For TOTE, the transition to LNG is both the right thing to do and is the best alternative to diesel. LNG has been safely used overseas for shipping and passenger ferries. SEA/LNG estimates that global LNG shipments have covered more than 100 million miles – about 4,000 times around the earth – without a major safety incident.

Sensitivities around clean air and water, and construction of a safe facility for access to LNG are appropriate. We welcome rigorous scientific and expert evaluation of the facility at the Port of Tacoma and we will abide by what is determined. To date, this agency's own additional evaluation determined in its draft supplemental environmental impact statement a conservative 13.5 percent reduction in greenhouse gas emissions from the TOTE vessels once converted to LNG. We celebrate that finding even while we believe it will be even greater than what is estimated so far.

The ramifications of not converting to LNG are serious. They come with true environmental consequences. It would mean more Particulate Matter and Nitrogen Oxides emitted in Puget Sound and our coastal waters at least for a decade or more. A status quo approach should be a non-starter for anyone who cares about cleaner air and water because it means an ongoing use of diesel fuel. The use of diesel offers no environmental benefits while continuing to erode environmental health. The Air Agency must take seriously both avoidable impacts this would have on human health and the signal it would send to other companies interested in doing more than the current Federal, State and Local regulations.

Change will not happen overnight. But when the opportunity to make improvements – even incremental improvements – that will result in verifiable reductions in air emissions are not only realistic, but common and available, we must pursue them. We urge you to finalize the SEIS and issue a permit for the construction of the LNG facility at the Port of Tacoma and we stand ready to answer questions about our role as its primary customer and as an employer and committed community member in Tacoma.

Sincerely,

Grace Greene
President
TOTE Maritime Alaska

0679-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0679-2 3. Outside of SEIS Scope

npa

new progressive alliance

NewProgs.org

RECEIVED
NOV 7 2018
Puget Sound
Clean Air Agency

November 5, 2018

Public Comment on DSEIS, PSE LNG Project

The Honorable Carole J. Cenci

Puget Sound Clean Air Agency
1904 Third Avenue
Suite 105
Seattle, WA 98101

The New Progressive Alliance at http://newprogs.org/ agrees with your decision to analyze the lifecycle of the greenhouse impacts of the PSE LNG Project and to conduct a more rigorous analysis. Thank you.

Puget Sound Energy's (PSE) eight million gallon liquefied natural gas (LNG) project threatens Tacoma, the nearby Puyallup Tribe, and our global climate.

Building more fracked gas infrastructure now commits the company to decades of buying gas from fracking wells with massive methane leaks. Estimates of methane releases have been drastically underestimated. (1) In light of the latest report from the Intergovernmental Panel on Climate Change, we know we don't have decades to spare. The time is now to turn to clean energy alternatives.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

The answer is not natural gas obtained by fracking - "in essence, explode a pipe bomb a few thousand feet beneath the surface, fracturing the surrounding rock." See reference 594. (Fracking is also used for uranium mining.) Unregulated by the EPA because of congressional action combined with the support of Presidents Obama and Trump, companies refuse to even reveal the chemicals they are "fracking" with, nobody is monitoring the pollution to water and our aquifers, and nobody is factoring the release of

0679-2 cont'd 3. Outside of SEIS Scope

methane as a GHG. Of the 750 chemicals that can be used in the fracking process, more than 650 of them are toxic or carcinogens, according to a report filed with the U.S. House of Representatives in April 2011.

See references 60, 63, 150, 183, 194, 220, 244, 280, 288, 296, 301, 303, 345, 355, 359, 370, 374 - 377, 404, 410, 414, 434, 456, 475, 483, 521, 542 - 544, 594, 602, 639, 683 - 689, 712, 713, 715 - 718, 734 - 736, 745, 746, 776, 815 - 824, 845, 846, 929 - 941, 989, 1052 - 1071, 1166 - 1173, 1345-1362, 1557, 1560-1561, 1576-1583, 1668-1669, 1687-1689, 1724, 1731, 1783-1787, 1937-1957, 2133-2139, 2249, 2317, 2421-2436, 2558-2564, 2598, 2667, 2747, 2776-2787, 2980-2982, 3168, 3170, 3171, 3187, 3222-3236, 3347, 3494-3496, 3507, 3853-3860, 3920, 4022, 4029, 4101, 4102, 4173 of the article at http://www.newprogs.org/the_environment_under_the_democratic_republican_uniparty

Together, this should be seen as a sufficient basis for denial of the Notice of Construction application. Thank you for your time and consideration of these comments.

(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405-12420, 2017.

Sincerely,

Ed Griffith

New Progressive Alliance

1000 17th Ave. #306

Longview, WA 98632-2358

United States of America

From: Paul Grimaldi
To: Public Comment
Subject: Public Comment
Date: Friday, October 26, 2018 1:10:04 PM
Attachments: Tote PSCAA Letter.pdf

To whom it may concern:

October 24, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave, Suite 105
Seattle, WA 98101

RE: Support Letter for Tote's Conversion
of their ORCA Class Vessels to LNG

Lynden Transport is a longtime customer of Tote serving the Alaska (AK) market from the PNW. Lynden Transport is a multimode transportation company that provides an important service to the Alaska market in partnership with Tote. Prior to ship service to AK goods were transported over the road in hundreds of trucks per week on the highway to AK. Once the ship service started 90%+ of our trucks were removed from road service utilizing a more efficient mode by placing those trailers on Tote ships rather than driving tractor/trailer to AK. Our industry prides itself on continuing to be efficient and stewards of the environment. At that time it was a very efficient move for Lynden and Tote to partner on the change from the highway to ship service. Now Tote is looking at a next level evolutionary change in being efficient and stewards of the environment by converting their ships from diesel fuel to LNG. As technologies improve and evolve it is prudent that our industry, and in this case Tote, continues moving forward with the benefits of conversion from diesel to LNG.

The environmental benefits involve 100% reduction in S0x, 99% reduction in particulate matter, 90% reduction in nitrogen oxides and 13.5% reduction in greenhouse gases as cited in their DSEIS. This conversion in many ways speaks for itself of the importance to the environment without compromising the performance of the ships. It takes a considerable investment on Tote's part to acknowledge the improved benefits to the environment from this conversion to their ships. In addition Tote has ships on the east coast that perform under LNG power displaying a safe operation, consistent performance and provides an environmental clean air improvement.

If the air permit is not approved the continued use of diesel even in its' lowest sulfur offering does not achieve the environmental benefits that Tote is trying to achieve with LNG, nor is it efficient for the ships to burn ultra-low sulfur. The performance of the ship suffers. This type of change to LNG will help to keep our ports competitive by being one of the early change agents in the PNW to LNG consistent with other ports around the world that are already using and building LNG facilities.

This process has been taking too long to get approval and consensus on an environmental clean air improvement that makes good sense. Further delays only lead to continued poor and unnecessary

air pollution.

The transportation industry recognizes the equipment required to keep our economies moving impacts our environment and it is always looking for new technologies and efficiencies to limit its' impact yet still provide the goods and services needed to the world. In our part of the world, the PNW, this is a smart change requiring considerable investment from Tote. As a customer of Tote, Lynden Transport supports their efforts to convert their ships to LNG and have the LNG support facilities to help improve the air quality without compromising safety or performance. We ask for the air permit to be approved.

Regards,

Paul Grimaldi
President
Lynden Transport, Inc.
18000 International Blvd, Suite 800
Seattle, WA 98188
206-575-9550

Paul Grimaldi | President | Lynden Transport, Inc. | Office: 206-575-9550 | www.lynden.com

LYNDEN TRANSPORT

Lynden Transport, Inc.
P. O. Box 3725
Seattle, WA 98124-3725
(206) 575-9575
(800) 426-5702
Fax: (206) 575-9617

October 24, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave, Suite 105
Seattle, WA 98101

RE: Support Letter for Tote's Conversion
of their ORCA Class Vessels to LNG

Lynden Transport is a longtime customer of Tote serving the Alaska (AK) market from the PNW. Lynden Transport is a multimode transportation company that provides an important service to the Alaska market in partnership with Tote. Prior to ship service to AK goods were transported over the road in hundreds of trucks per week on the highway to AK. Once the ship service started 90%+ of our trucks were removed from road service utilizing a more efficient mode by placing those trailers on Tote ships rather than driving tractor/trailer to AK. Our industry prides itself on continuing to be efficient and stewards of the environment. At that time it was a very efficient move for Lynden and Tote to partner on the change from the highway to ship service. Now Tote is looking at a next level evolutionary change in being efficient and stewards of the environment by converting their ships from diesel fuel to LNG. As technologies improve and evolve it is prudent that our industry, and in this case Tote, continues moving forward with the benefits of conversion from diesel to LNG.

The environmental benefits involve 100% reduction in S0x, 99% reduction in particulate matter, 90% reduction in nitrogen oxides and 13.5% reduction in greenhouse gases as cited in their DSEIS. This conversion in many ways speaks for itself of the importance to the environment without compromising the performance of the ships. It takes a considerable investment on Tote's part to acknowledge the improved benefits to the environment from this conversion to their ships. In addition Tote has ships on the east coast that perform under LNG power displaying a safe operation, consistent performance and provides an environmental clean air improvement.

If the air permit is not approved the continued use of diesel even in its' lowest sulfur offering does not achieve the environmental benefits that Tote is trying to achieve with LNG, nor is it efficient for the ships to burn ultra-low sulfur. The performance of the ship suffers. This type of change to LNG will help to keep our ports competitive by being one of the early change agents in the PNW to LNG consistent with other ports around the world that are already using and building LNG facilities.

This process has been taking too long to get approval and consensus on an environmental clean air improvement that makes good sense. Further delays only lead to continued poor and unnecessary air pollution.

The transportation industry recognizes the equipment required to keep our economies moving impacts our environment and it is always looking for new technologies and efficiencies to limit its' impact yet still provide the goods and services needed to the world. In our part of the world, the PNW, this is a smart change requiring considerable investment from Tote. As a customer of Tote, Lynden Transport supports their efforts to convert their ships to LNG and have the LNG support facilities to help improve the air quality without compromising safety or performance. We ask for the air permit to be approved.

Regards,



Paul Grimaldi
President
Lynden Transport, Inc.
18000 International Blvd, Suite 800
Seattle, WA 98188
206-575-9550

[00:23:00]

Carole: Thank you. Our next commenter is Jason Hagey.

Jason: Thank you. Good afternoon. My name is Jason Hagey. I'm vice president of communications at the Association of Washington Business. AWB is Washington's oldest and largest statewide business association representing nearly 7,000 members from across all industries. Thank you for the opportunity to comment today. AWB supports continued construction of PSE's LNG facility at the Port of Tacoma because of the numerous environmental and economic benefits it will provide.

Locating this facility, the Port of Tacoma will allow maritime operations to transition from dirty, conventional fuels to cleaner LNG fuels reducing sulfur emissions more than 99%, nitric oxide and nitrogen dioxide emissions by nearly 85%, and greenhouse gas emissions by nearly 15%.

[00:24:00] The draft SEIS stated that replacing a diesel engine with an LNG engine will result in reduced lifecycle greenhouse gas emissions. TOTE Maritime is planning on switching to LNG for its vessels. And locating this state of the art facility here will give the Port of Tacoma and the state of Washington a competitive advantage. This project will improve reliability allowing PSE to serve customers on the coldest days of the year, when our electricity system depends on natural gas to meet demand, and when there are disruptions to the system like the one that occurred earlier this month.

On October 9, a pipeline that fees Washington State ruptured, and its gas supply was turned off. As a resident of Pierce County and a customer of PSE, I received an email notifying me of the situation and asking me to conserve natural gas. Many of PSE's major customers were required to curtail their use of natural gas impacting their businesses. With the LNG facility in production, this curtailment could have been avoided.

[00:25:02] Finally, we support this project because of the good jobs it will create and support throughout the Port of Tacoma and this region. This is the right place for this kind of job creation. The port, which has long been a major economic driver for Pierce County is an established industrial area. And this project is consistent with the types of uses located in the area. Our members are continually striving to reduce their carbon footprint and expand economic opportunity throughout Washington. The PSE LNG project will

further both of these objectives, and we urge you to support. Thank you.

1219-1 23. General Support

Steve: Good afternoon. My name is Steve Hartmann. I am a resident of Pierce County, Washington. And I am the vice president of Linden Transport based here in Fife, Washington. Linden Transport is a major provider of transportation services between the state of Washington and the state of Alaska. We have been a long term partner customer of TOTE Maritime Alaska. In fact, we've been their largest customer, since Day 1, in 1975. And when we began using TOTE Maritime, we took over 125 semi tractors off the road that made the route ever week between Washington and Alaska.

[01:19:05] We urge you, with all of our support, to issue the needed air permit to Puget Sound Energy for their planned LNG facility. This facility is needed, so TOTE can complete the LNG conversion of their Orca class ships. We operate our gateway service center just a couple of miles from the planned location in Fife, Washington.

We're a long time employer of the Puget Sound area, with over 1,000 employees throughout the Linden family of companies. TOTE's conversion to LNG in Puget Sound Energy's LNG facility will create the following environmental benefits as mentioned in the supplemental environmental impact statement: 100% reduction in sulfur oxides, 99% reduction in particulate matter, 90% reduction in nitrogen oxides, and 13.5% reduction in greenhouse gases.

[01:20:07] The maritime industry has realized the clean fuel of the future is LNG. And to be competitive, the ports throughout the world are making LNG available to their maritime customers. The northwest ports need to do the same. Thank you.

Carole: Thank you. Councilmember Anna Bean? Dan Kovacich? Dakota Case? And Christopher Winters.

1946-1 23. General Support

Brick, Janet

From: Steve Hartmann <steveh@Lynden.com>
Sent: Wednesday, October 24, 2018 1:39 PM
To: Public Comment
Subject: Air Permit for Puget Sound Energy LNG Facility
Attachments: Letter to the PSCAA Oct 23 2018.pdf

To whom it may concern,

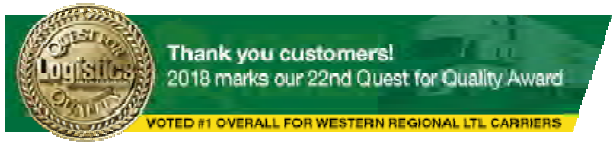
Please see the attached letter.

Thanks!

Sincerely,

Steve Hartmann

Steven M. Hartmann | V.P., Sales & Marketing | **Lynden Transport, Inc.** | 206-575-9547 W
253-677-4920 C | steveh@lynden.com



LYNDEN TRANSPORT

Lynden Transport, Inc.
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Seattle, WA 98124-3725
(206) 575-9575
(800) 426-5702
Fax: (206) 575-9617

October 23, 2018

Puget Sound Clean Air Agency (PSCAA)
Attn: Public Comment
1904 3rd Avenue, Suite 105
Seattle, WA 98101

Re: Timely Issuance of Air Permit for Puget Sound Energy and their LNG Facility

Dear Puget Sound Clean Air Agency,

My name is Steve Hartmann, I live in Bonney Lake, WA and I can see the Port of Tacoma from my subdivision. I am the Vice President, Sales & Marketing at Lynden Transport, Inc. Lynden Transport is a major provider of transportation services between the States of Washington and Alaska. We have been a long term partner customer of TOTE Maritime Alaska, in fact we've been their largest customer since day 1. TOTE Maritime Alaska is an excellent high quality provider of ship services to and from Alaska and we depend on TOTE to move roughly 80% of our business each and every week on their twice a week sailings. TOTE is a reputable partner with good integrity. They care about people and the environment.

We urge you with our full support to issue the needed Air Permit to Puget Sound Energy for their planned LNG Facility. This Facility is needed so TOTE can complete the LNG Conversion of their ORCA Class Ships. We operate our Gateway Service Center just a couple of miles from the planned location in Fife, WA. We are a long time employer in the Puget Sound Area with over 1000 employees throughout the Lynden Family of Companies.

TOTE's conversion to LNG and Puget Sound Energy's LNG facility will create the following environmental benefits,

1) 100% reduction in Sulfur Oxides (SOx)
2) 99% reduction in particulate matter
3) 90% reduction in Nitrogen Oxides
4) 13.5% reduction in greenhouse gases as cited in their Draft Supplemental Environmental Impact Statement

Non approval of this Air Permit would cause TOTE to continue to burn Diesel which significantly falls short of achieving these environmental benefits.

The Maritime Industry has realized the clean fuel of the future is LNG and to be competitive the Ports throughout the world are making LNG available to their Maritime Customers.

It is our request of you to act promptly and to do what is right in issuing this Air Permit to Puget Sound Energy. For whatever reason the current environmental review is taking much too long. Much of the additional analysis should have been completed in the original EIS. In order for these very large investments and improvements to take place please act promptly so this progress can stay on schedule and we can reap the benefits of a cleaner healthier environment. Any further delay just leads to more unnecessary air pollution.

Thank you for your time and consideration. We look forward to your responsible decision to allow these improvements to move forward.

Sincerely,

Steve Hartmann
Vice President, Sales & Marketing
Lynden Transport, Inc.

Carole: Thank you. Todd Hay?

Todd: Good afternoon. My name is Dr. Todd Hay. I'm the president of Advocates for a Cleaner Tacoma, a local environmental nonprofit. And I'm here representing a coalition of 28 environmental health and social justice groups, including the Sierra Club, Earth Ministry, 350 Tacoma, 350 Seattle, as well as other groups. We are all in agreement that the SEIS, as currently written, is unacceptable. We have written a letter with our concerns, but I want to highlight a few of those now. Our first concern is that you are not using the best available scientific data and considering longer term climate impacts.

[01:15:03] The report uses a methane global warming potential value from the UN from 2007, despite the fact that the value was updated by the UN in 2013 and then, again in a peer reviewed scientific paper in 2016. Also, given the recent UN report that talked about how we need to drastically change our energy fuel mix by 2030, otherwise face dire environmental consequences by 2040. The analysis should really be using the 20 year GWP value for methane. When making either of these changes, in the model, which I did, it shows that the LNG plant is actually dirtier than the existing diesel solution, 50% dirtier when used at 20 year value.

Fifty percent dirtier. The report also misrepresents the true methane leakage rate coming from BC. It relies upon three references, all upon further scrutiny show start breaking down. One report, for instance, is based on a master's thesis that covers gas fuels in Alberta, not even in BC. And it explicitly states that the wells under study are not representative of the entire industry.

[01:16:03] And so, the leakage rate should not be extrapolated as such. The report also fails to recognize three independent scientific empirical studies that provide hard evidence that the methane leakage rates are significantly underreported, upwards of two times under reported. The report also claims the emission reduction credits for customers that they don't even have. They only have TOTE Maritime secured. None of these other maritime customers are secured. The report uses lower methane slippage rates for the TOTE vessels, counter to PSE's own peer reviewer, in their own analysis.

Changing that value as well shows that the entire facility is dirtier than diesel. The report is missing data such as rail and truck emissions for transporting the fracking sand, which comes from

1228-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1228-2 13. LCA Inputs and Assumptions - Natural Gas Source
1228-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1228-4 19. LCA Inputs and Assumptions - End Use
1228-5 10. LCA Calculations

Wisconsin 1,500 miles away, and the water, as well, for the fracking wells. It uses incorrect units of measurement, when doing certain calculations. And it still has placeholder values, as we already heard. Now, we recognize that you're required to follow the law. And we respect that. And the WAC says to use these older 2007 GWP numbers.

[01:17:00] We also know that the RCW talks about doing specific greenhouse gas emission reductions in this state. And then, we have the UN telling us to change our energy fuel mix in 12 years. So, we challenge the Air Agency, use the RCW that calls out for these greenhouse gas emissions, use that as a lever to, basically, include the best available scientific data and to focus on the near term impacts of this plan, as that is of the utmost importance. Nature, after all, doesn't care about the WAC code and its older GWP numbers.

So, we respectfully ask you to retract the SEIS, modify it to address our technical issues, and then, reissue a document, with a full public comment period following this new analysis. Thank you.

Carole: Thank you. So, the next five commenters are Steve Hartmann, Councilmember Anna Bean, Dan Kovacich, Dakota Case, and Christopher Winters.

[01:18:08] And we have about 75 more people signed up to speak. So, please, if you at all possibly can, limit your comments to two minutes. That will at least get through a few more people.

1228

1228-5 cont'd 18. LCA Inputs and Assumptions - Marine Diesel Oil

1228-6 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Todd Hay
To: Public Comment
Cc: Janna Stewart; Nanette Reetz; Steve Storms; Twylia Westling
Subject: Comment Regarding PSE LNG GHG SEIS
Date: Tuesday, November 20, 2018 8:13:59 PM
Attachments: PSE LNG ARS Expert Report.pdf

Dear PSCAA-

Attached is an expert review conducted on the behalf of Advocates for a Cleaner Tacoma (ACT) for the PSE LNG Greenhouse Gas Emissions Lifecycle Analysis SEIS. Please consider this as part of the public testimony on behalf of ACT.

Sincerely,

Todd Hay, PhD, President
Advocates for a Cleaner Tacoma (ACT)
todd.hay.act@gmail.com

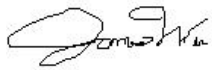
TECHNICAL REVIEW –
PUGET SOUND ENERGY TACOMA LIQUEFIED NATURAL GAS PROJECT
PORT OF TACOMA

Expert Report

Prepared by:
James Wu

Air Resource SPECIALISTS

1901 Sharp Point Dr., Suite F
Fort Collins, CO 80525
970-484-7941
www.air-resource.com



James Wu

November 5, 2018

1279-1 19. LCA Inputs and Assumptions - End Use
1279-2 17. LCA Inputs and Assumptions - Peak Shaving

1.0 INTRODUCTION & EXECUTIVE SUMMARY

This technical report describes a review of the Draft Supplemental Environmental Impact Statement (SEIS) for the Tacoma Liquefied Natural Gas (LNG) facility (project). Specifically, the review focuses on the SEIS life-cycle analysis modeling of greenhouse gas (GHG) emissions and impacts for the project.

This review has been prepared by Air Resource Specialists, Inc. (ARS) on behalf of Advocates for a Cleaner Tacoma (ACT), a non-for-profit 501(c)(3) citzens' organization based in Tacoma. Qualifications of the author are provided in Attachment A.

The technical analyses in this report describe concerns with the modeling results, in particular areas that project inputs or assumptions favor lower GHG emissions for the LNG project. For several reasons, as explained within this report, the net reduction in GHG emissions attributed to the project compared to the No Action alternative may be greatly overstated.

2.0 NEW LNG PLANT - END USE LNG CONSUMPTION

The SEIS GHG analysis assumes an "end use mix" (Scenario A, 250,000 or Scenario B, 500,000 gallons per day (gpd) production) for the project's LNG production, which is stated in sections 2.4.5 and 3.3 of Appendix C: GHG Analysis Report. The report only states the end use mix is "assumed as input." The "DSEIS LCA calculations" Excel spreadsheet(s) input tab includes the following comment "Source: PSE-BID". No further explanation appears to be provided by references, sources, etc. for these consumption levels in the SEIS or Excel calculations (with the exception of the known commitment by TOTE). Since the conclusions of the GHG analysis rely on the replacement of other or existing petroleum-based fuels with LNG, the SEIS should fully document the critical LNG end use mix assumptions for both project scenarios.

3.0 DIESEL ON-SITE PEAK SHAVING - END USE LNG CONSUMPTION

Chapter 3.3.1 of SEIS discusses the diesel peak shaving assumed for the No Action Alternative. The 5.89 million gallons of diesel fuel per year value does not appear to have a source or reference, and it is not clear if it is based on a historical Puget Sound Energy, Inc. (PSE) peak shaving value, so clarification is necessary.

Appendix C section 2.2.1 states that PSE operates peak shaving turbines burning natural gas or diesel fuel. Explanation is needed for discussion that the No Action alternative assumed diesel for peak shaving due to insufficient natural gas pipeline capacity. Unless justified, the No Action assumption that the displaced fuel consists entirely of diesel appears to overestimate No Action GHG emissions. The SEIS should fully document these peak shaving assumptions related to the project's LNG end use.

1279-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1279-4 7. SEPA Alternatives
1279-5 14. LCA Inputs and Assumptions - Leakage/Slippage
1279-6 13. LCA Inputs and Assumptions - Natural Gas Source

4.0 TOTE & OTHER MARINE VESSEL METHANE SLIPPAGE

The SEIS appears to assume methane slip emission factors from "GHG and NOx Emissions from Gas Fueled Engines", SINTEF, 2017, as indicated by the “DSEIS LCA calculations” Excel spreadsheet (EF Marine Vessels spec. TOTE tab). However, it appears the SEIS spreadsheet(s) incorrectly uses the 5.3 g/kW-hr methane emission factor for the “Average, all engine type”, instead of the 6.9 g/kW-hr factor for low pressure dual fuel (LPDF) engines, as recommended by the SINTEF report’s Table 1.1.

This correction significantly increases the marine LNG (TOTE Marine and Other Marine) end use methane emissions calculated by the spreadsheets for the SEIS analysis and therefore decreases or cancels out any net CO_{2e} emissions benefit from the overall LNG project compared to the No Action (net emissions reduction for Scenario A estimated to decrease by 79% - GHG emissions reduction in % becomes 1.13% instead of 5.48%; Scenario B estimated to have a net increase instead of reduction - increase of 0.53% instead of reduction of 3.93%).

5.0 OTHER MARINE & ON-ROAD TRUCKING END USE LNG

Besides TOTE Marine, the largest other LNG end use is "Other" marine, which is also the source of the New LNG Plant's largest reduction of CO_{2e} compared to the No Action Alternative. However, other than the Appendix C section 4 discussion of the mandated marine fuel oil sulfur limit (January 1, 2020), and the corresponding options for compliance such as scrubbers, low sulfur fuel, etc., the SEIS does not substantiate the assumptions made for non-TOTE marine LNG end use consumption (for either 250,000 or 500,000 gpd scenarios).

Section 4 presents some of the negatives of the non-LNG options (additional power use, fuel consumption, increased GHG emissions), but no corroborated conclusions. Given the known barriers (cost, etc.) of converting ships and other equipment to LNG from marine diesel, an analysis should be performed to determine the appropriate level of LNG adoption by other marine companies. For on-road trucking’s conversion from diesel to LNG (Scenario B only), similar barriers to adoption of the new fuel need to be addressed as well. The SEIS should document any LNG end use assumptions, and most conservatively, the GHG modeling should not assume additional LNG end uses beyond current commitments when presenting potential GHG emissions.

6.0 NEW GREET 2018 RELEASE

A recent GREET model release (Oct 10, 2018) has “Updated Methane Leakage of Natural Gas Supply Chain”, relevant to the SEIS analysis. The model updates should be evaluated to insure that assumptions in the GHG analysis are up-to-date.

7.0 UPSTREAM LIFECYCLE – B.C. GAS FROM HYDRAULIC FRACTURING

SEIS Appendix B section 2.4.4 for Natural Gas well-to-tank (WTT) states "Data on the source of natural gas have been requested." The analysis needs to indicate if this information has been provided to the public. Appendix B, Table 3.7 and the LCA calculation spreadsheets note that the GHGenius model is the source for the British Columbia (B.C.) gas upstream emission factors,

1279-6 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1279-7 14. LCA Inputs and Assumptions - Leakage/Slippage
1279-8 12. LCA Inputs and Assumptions - Global Warming Potential Value

however the SEIS does not provide sufficient information on the assumptions used in the model, or quality of the source data, etc. Therefore, the SEIS should include background and assumptions related to the values obtained from GHGenius model, along with explanation regarding whether the model accounts for emissions associated with trucks transporting water and sand for fracturing (presumably part of the extraction step of upstream emissions reported on Table 3.7).

8.0 UPSTREAM LIFECYCLE – GAS WELL METHANE LEAKAGE

Appendix B.1 discusses upstream methane emissions/losses from upstream processing of natural gas, noting the GHGenius result for B.C. gas is the appropriately regionally specific value for the project. However, the appendix also states that data and studies indicate methane emission rates vary and can be much higher than those assumed for the analysis and the B.C. region in general, as shown in the summary presented on Table B-3. In light of the most recent GREET model data (new model release previously discussed) and studies included on Table B-3, along with other recent research or studies indicating that methane leak rates may be underestimated by the B.C. government, the SEIS analysis should assume a more conservative upstream methane emission rate.

In addition, general statements in this appendix that B.C. and Canada GHG emissions are lower than United States averages do not appear to be sufficiently justified. The SEIS should describe the "better management practices and potentially Canadian requirements on emission controls" that support a lower B.C. emission rate. Information should be provided in the SEIS as to why newer wells, pads and super pads have lower emissions, and that these are common in B.C., if this supports the lower methane emission rate assumed in the analysis. Incorporating a more conservative, higher upstream methane leak rate would significantly decrease the net CO_{2e} emissions benefit from the overall LNG project vs the No Action.

9.0 IPCC GWP

The more recent Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) should be used, which will increase the LNG project CO_{2e} emissions (specifically, by the methane Global Warming Potential (GWP)) and have a significant effect on reducing the claimed net reduction. EPA presents a methane GWP range of 28-36 over 100 years as current state of the science, compared to GWP 25 employed in the analysis. The SEIS does not provide any reason not to use the newer, updated AR5 guidance, and doing so would also make the analysis more conservative.

The use of the shorter term 20-year time horizon is also recommended, as more conservative. The SEIS states the 100-year horizon is consistent with the time horizons for the project, but the estimated project duration of 40 years does not appear to support this. If the 20-year time horizon is assumed, it is estimated the GWP value for methane (84-87) would make the LNG project a net CO_{2e} increase due to the higher methane emissions from marine vessels LNG. Given recent information regarding potential climate change implications in the very near term, the SEIS should use or evaluate the 20-year GWP, or document why the shorter time horizon is not appropriate for a project with a 40 year life, in order to appropriately consider GHG impacts relative to gases with shorter lifetimes such as methane.

10.0 SUMMARY & CONCLUSIONS

A technical review has been conducted of the SEIS life-cycle analysis modeling of GHG emissions and impacts of the Tacoma Liquefied Natural Gas LNG facility.

The technical analyses in this report describe concerns with the modeling results, in particular areas that project inputs or assumptions favor lower GHG emissions for the LNG project. For the reasons summarized below, recommended modifications to the analysis are likely to increase the LNG project's CO_{2e} emissions, and therefore, significantly reduce the net reduction in GHG emissions attributed to the project compared to the No Action alternative.

- The SEIS's assumption of levels of LNG "sales" above known commitments (such as from TOTE), is concerning, resulting in significantly overstating the potential GHG reduction benefits of the project.
- The SEIS should fully document the peak shaving assumptions related to the project's LNG end use and the No Action's diesel use.
- The SEIS appears to use the incorrect methane slip emission factor for marine vessel LNG end use.
- The SEIS should include an analysis determining the appropriate level of LNG adoption by other marine and on-road trucking companies. The SEIS should completely document LNG end use assumptions, and most conservatively, the GHG modeling should not assume additional LNG end uses beyond current commitments.
- The SEIS should include background and assumptions related to the values obtained from the GHGenius model for upstream natural gas hydraulic fracturing emissions, including explanation whether or not the model accounts for emissions associated with trucks transporting water and sand for fracturing.
- Based on the most recent GREET model data and studies included on SEIS Table B-3, along with other recent research and studies indicating methane leak rates may be significantly underestimated, the modeling analysis should assume a more conservative upstream methane emission rate.
- The SEIS should use the newer IPCC AR5, with a more conservative methane GWP range of 28-36 over 100 years, the current state of the science (EPA), compared to the GWP 25 employed in the analysis. In addition, the SEIS should use or evaluate the 20-year GWP, or document why the shorter time horizon is not appropriate for the project.

ATTACHMENT A

Professional Resume of James Wu

JAMES WU

Project Manager / Greenhouse Gas Services Manager

EDUCATION

B.S.E. Chemical Engineering, Princeton University 1989

MEMBERSHIPS

Air & Waste Management Association

EXPERIENCE SUMMARY

Mr. Wu has 23 years' experience in air quality compliance and permitting, and has performed hundreds of stationary and mobile source analyses. He specializes in bringing a variety of complex projects through technical review to agency approval. He currently is the greenhouse gas (GHG) services manager and a project manager in the environmental compliance section at Air Resource Specialists, Inc., and provides technical studies and evaluations, and prepares client permit applications and air quality modeling analyses.

PROJECT EXPERIENCE

- Produces and manages quality assurance documents including quality management plans and quality assurance project plans. Provides emissions and GHG inventories, dispersion modeling, regulatory analysis and interpretation, and air compliance auditing.
- Prepares applications for new source permits under federal Prevention of Significant Deterioration (PSD) and state construction and operating permit programs.
- Provides technical studies supporting Environmental Impact Statements (EISs) and Environmental Assessments (EAs) under the National Environmental Policy Act (NEPA).
- Provides GHG emissions management and climate change management planning.
- Participates in all aspects of client projects, including business development, proposals, and overall quality control.
- Performs permitting and air quality studies for bio-fuel (ethanol), oil & gas/petroleum, mining and minerals, semiconductor, and National Park Service (NPS) projects, with experience representing both government and private clients.
- Previous project management experience (with former employer) includes mobile and stationary source air quality studies for transportation and infrastructure, urban development, power generation, wastewater treatment, industrial, and construction projects.
- Knowledgeable in the use of a wide range of software applications for environmental analyses, including U.S. Environmental Protection Agency (EPA) mobile source models MOVES, NONROAD, CAL3QHC, and CAL3QHCR, and such stationary source emission models as AERMOD, SIMS, TANKS, and INPUFF.

1298-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1298-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

October 30th, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Dear Puget Sound Clean Air Agency,

We are a coalition of environmental, health, and social justice groups writing in response to the draft Supplemental Environmental Impact Statement (SEIS) for greenhouse gas (GHG) emissions for the Puget Sound Energy (PSE) liquefied natural gas (LNG) facility in the Port of Tacoma. We would like to thank you for requiring this GHG SEIS and for taking seriously the environmental impacts of this project. We also stand with the Puyallup Tribe in opposition to the LNG facility.

Having examined the draft SEIS, we have a number of serious concerns when it comes to the impact of this facility on public health and climate change. The entire list of these concerns is detailed in the attachment, but we would like to raise some of the main points directly in this letter. These include:

Not Using the Best Available Science - Our first concern is that the SEIS is not using the best available science in calculating its greenhouse gas emissions. The SEIS relies upon 11-year old global warming potential (GWP) values, for methane in particular, rather than the most recent scientific evidence from 2016.[1] Merely making this one modification in using the 2016 GWP values, reveals that the LNG plant will actually produce more GHGs than the No Action Alternative.

Using 100-year GWP values instead of 20-year values - We are also concerned that the SEIS uses the 100-year GWP values, and not the more immediate 20-year GWP values. We understand that the 100-year values have traditionally been used for this type of analysis, but the looming impacts of climate change warrant using the 20-year values. On the same day that the SEIS was released, the United Nations' Intergovernmental Panel on Climate Change (IPCC) released their latest report[2] outlining imminent climate change impacts. Their report indicates that we have only 12 years to change our energy fuel mix away from fossil fuels and towards renewable technologies, otherwise we will face severe environmental consequences in 2040. Their estimates are not based on 100 year projections, but 12 and 22 year projections. By appropriately analyzing the impacts over the next 20 years, the GHG model demonstrates that

[1] https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016GL071930
[2] https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml

1298-2 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1298-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1298-4 13. LCA Inputs and Assumptions - Natural Gas Source

the LNG project is actually more than 50% dirtier from a GHG perspective than the No Action Alternative.

British Columbia Methane Leakages Rates Used are Highly Suspect - We are also concerned about the purported B.C. methane leakage rates used in the GHG emissions modeling. The SEIS provides three references for B.C. methane leakage rates, all of which require further review to fully determine if they are legitimate representations of B.C.-wide fracked gas methane leakage rates. We know, for instance, that one of them (Brandt et al, 2017 [3]) is derived from a Master's Thesis covering gas wells in Alberta, not B.C., that states that the emissions examined in the report are lower than industry average due to a variety of reasons. Therefore, it would be inappropriate to extrapolate the results of such a study to all B.C.-fracked gas wells. The SEIS also fails to incorporate recent, peer-reviewed reporting indicating that B.C. methane leakage rates are severely underreported[4]. As a result, we do not believe the SEIS's methane leakage rates are accurate; instead we believe that they need to be re-evaluated and likely revised to a higher value. We suspect that using a realistic methane leak rate would also show that the GHG emissions of the LNG plant are greater than the No Action Alternative.

No Guarantees that Gas will only come from B.C. - The draft SEIS requires that all of the gas for the facility will be sourced from British Columbia. During the recent gas pipeline explosion in B.C. on October 10th, it is our understanding that PSE used gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. PSE's own 2017 10K filing with the Securities and Exchange Commision (SEC) shows that in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). We have concerns that PSE will source gas from places other than B.C., as well as concerns about their accountability for their sourcing.

The remainder of our comments are described in the attachment. This draft SEIS does not account for the full climate impacts of fracked gas. In light of these serious concerns, we respectfully request that you address these concerns and reissue the SEIS with a new, full public comment period. We look forward to your response.

Sincerely,

---

[3] https://ngi.stanford.edu/sites/default/files/110_Brandt.pdf
[4] https://doi.org/10.5194/acp-17-12405-2017

Todd Hay, PhD, President
Advocates for a Cleaner Tacoma (ACT)

350 Tacoma

Laura Skelton, Executive Director
Washington Physicians for Social Responsibility

Penny Rowe, PhD
Climate Scientist

Redefine Tacoma

Darren & Benita Moore, Founders
Native Daily Network

Kevin Jones, Board Member
Vashon Climate Action Group

Michael Cox, Co-chair
Climate Action Bainbridge

Paul Cheoketen Wagner, Co-founder
Protectors of the Salish Sea

Matt Remle, Co-founder
Mazaska Talks

Roxanne White,
Missing & Murdered Indigenous Women and Girls Collaborative

Twylia Westling
Civic Actions for the Salish Sea

Stop Fracked Gas/PDX

Tracy Wiegman, Sarah Morken, Marilyn Kimmerling
Direct Action Tacoma

350 Eastside

Jesse Piedfort, Director
Sierra Club Washington State Chapter

Stacy Oaks, Keep It In the Ground Lead
350 Seattle

Regna Merritt, Healthy Climate Program Director
Oregon Physicians for Social Responsibility

LeeAnne Beres, Executive Director
Earth Ministry & Washington Interfaith Power & Light

Puyallup Water Warrior Movement

The Conversation
A social justice group

Kriss A. Kevorkian, PhD, MSW, Founder
Legal Rights for the Salish Sea

Gabe Scott, In-house Counsel
Cascadia Wildlands

Hannah Sohl, Director
Rogue Climate

Alex Ramel, Field Director
Stand.earth

Adonis Piper and Sophia Thompson
Youth Co-Presidents
Plant for the Planet Seattle

Benjamin Smith, Field Organizing Manager
Greenpeace USA

Climate Action Coalition

Kurtis Dengler
Mosquito Fleet

NWDC Resistance/Resistencia al NWDC

1298-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
1298-6 12. LCA Inputs and Assumptions - Global Warming Potential Value
1298-7 14. LCA Inputs and Assumptions - Leakage/Slippage

Technical Concerns

The draft SEIS uses an outdated methane global warming potential (GWP) - GWP is a measure of how much heat a greenhouse gas traps in the atmosphere relative to carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however, has a much larger GWP for timescales of 500 years or less. The draft SEIS uses the United Nations' 2007 value of 25 for the 100-year GWP of methane. However, they should be using the peer-reviewed 2016 value of 32[5]. This single modification in SEIS GHG model makes the LNG plant dirtier from a greenhouse gas emissions perspective than if the LNG plant were not built. The following chart shows different GWP values for 20 and 100 year periods based on IPCC reports in 2007 and 2013, and an independent scientific study completed in 2016. The SEIS used the lowest values possible.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	84	28
2016 Scientific Study (authors include the lead scientist from 2013 IPCC report)	96	32

Methane is significantly more potent in the short-term, yet the SEIS analysis only looks at the long-term impact - Methane has a much higher GWP than carbon dioxide over time periods of less than 500 years. The draft SEIS analysis is based on the 100-year GWP of methane. The IPCC report released a report on October 8th, indicating that we must change our energy fuel mix in the next 12 years to avoid the worst effects of climate change. Therefore, the SEIS should use the 20-year GWP, as that is the timeframe when action is required. Using the most recent 20-year GWP value of 96 makes the LNG plant 50% dirtier than the No Action Alternative.

Lack of evidence that B.C. fracked gas is as clean as claimed - The draft SEIS falsely assumes that B.C. fracked gas would result in a GHG emissions reduction. The SEIS provides three references for B.C. methane leakage rates, all of which require further review to fully determine if they are legitimate representations of B.C.-wide fracked gas methane leakage rates or not. We know, for instance, that one of them (Brandt et al, 2017[6]) is derived from a Master's Thesis covering Canadian gas wells outside of B.C. that states that the emissions examined in the report are lower than industry average due to a variety of reasons. It is inappropriate to extrapolate the methane leakage rate from that report to all of B.C. fracking wells. Additionally,

[5] https://doi.org/10.1002/2016GL071930
[6] https://ngi.stanford.edu/sites/default/files/110_Brandt.pdf

the SEIS fails to incorporate methane leakage data from a 2017 peer-reviewed report[7] and a 2018 non-profit foundation report[8], that use empirical, independent physical studies at well sites. The 2018 report found that 85 percent of active wells are directly venting methane daily, and that those leakages have been historically underreported. The same report found that methane emissions in B.C. are significantly higher than reported by industry.

No guarantee that all of the fracked gas would come from B.C. - The draft claims that all of the gas will be coming to the facility from British Columbia. During the recent gas pipeline explosion in BC on October 10th, it is our understanding that PSE sourced gas from the Rocky Mountains or North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. PSE's own 2017 10K filing with the Securities and Exchange Commision (SEC) shows that in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). We are not convinced that the facility will only use gas sourced from B.C.

No alternative sourcing plan in the event of larger than anticipated methane leaks - The SEIS requires the PSE LNG facility to get its fracked gas from Canada even in the case of larger methane leakage rates. If later studies show that actual leaks are considerably larger, it is unclear whether the facility will stop production and distribution.

Discrepancies between regulations and implementation - The SEIS claims that we should expect to see reductions in the amount of upstream fugitive emissions given B.C.'s new, tough regulations on fugitive methane emissions. However, simply because a regulation has been passed, implementation of that regulation in the field is typically not immediate. Regulations also depend upon political will and are therefore susceptible to change. The SEIS should only assume methane emission leak rates based on empirically collected data, and not on unsupported predictions.

Analysis assumes credit for extra maritime customers that currently do not exist - The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.

Questionable Methane Slippage Rates for TOTE Vessels - The SEIS appears to be using unacceptably small methane slippage rates (the amount of unburned methane that will escape into the atmosphere) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis included in the SEIS, their external peer

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[7] https://www.atmos-chem-phys-discuss.net/acp-2017-109/

[8] https://davidsuzuki.org/wp-content/uploads/2018/01/investigating-fugitive-emissions-abandoned-suspended-active-oil-gas-wells-montney-basin-northeastern-british-columbia.pdf

1298-7 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
1298-8 13. LCA Inputs and Assumptions - Natural Gas Source
1298-9 14. LCA Inputs and Assumptions - Leakage/Slippage
1298-10 13. LCA Inputs and Assumptions - Natural Gas Source
1298-11 19. LCA Inputs and Assumptions - End Use
1298-12 14. LCA Inputs and Assumptions - Leakage/Slippage

reviewer questioned PSE's assumption of their methane slippage rate indicating that they should be using the higher rate, as that is considered best practice.

Cut Off Threshold - The SEIS includes a 1% cutoff threshold, such that any emissions source which produces less than 1% of the total GHGs for the system is automatically excluded from the overall calculations. We would like to know all of the sources that fall into this cutoff threshold category and the estimated percentage of GHG emissions coming from those sources. Our concern is that if the analysis incorporates multiple sources less than 1%, but cumulatively these add up to a significant percentage of the overall GHG emissions (say, three 0.8% sources adding up to 2.4%), then this could significantly under represent the true GHG emissions value.

No fuel alternative options for ships is a false assumption - Currently TOTE Maritime is the only shipping company in the Port of Tacoma that has committed to converting their vessels to run on LNG, yet all of the shipping companies are required to meet the 2020 International Maritime Organization (IMO) low sulfur emissions requirements. TOTE is already compliant with this requirement; it has been using ultra-low sulfur diesel (ULSD) since February 2017. Therefore they have no regulatory need to convert to LNG. Other companies are either also using ULSD or are incorporating scrubbers into their vessels to meet the IMO requirement. Additionally, TOTE converted to using electric, shore-based power when they are in port in Tacoma. Finally, the Washington State Ferries were considering converting to using LNG, but have since abandoned that in favor of electric engines in order to reduce their carbon footprint and cut costs.[9]

Peak shaving demand for PSE electricity customers can be met by other means - The peak shaving component of the LNG plant will be used to generate electricity for PSE electricity customers. Currently, without the LNG plant, PSE must burn diesel to generate this extra electricity on a peak-shaving day. The SEIS indicates that the Frederickson combined cycle turbine is where the peak shaving will occur and that an additional 26 MW of power can be created during peak-shaving operations. We would like to be provided with more details concerning the peak shaving need, such as the full power and energy required for peak shaving operations. These are not explicitly stated in the draft SEIS. PSCAA should then use that information to perform GHG emissions analysis for other technology alternatives such a battery storage or even purchasing wholesale electricity from Tacoma Power (which is 97% fossil-fuel free).

Analysis does not incorporate all emissions - The vast majority (85 - 98% as of 2016[10,11]) of the gas wells in British Columbia are fracking wells and fracking requires large consumption of

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[9] https://www.seattletimes.com/seattle-news/transportation/washington-state-ferries-plans-to-convert-its-biggest-vessels-to-electric-power/

[10] https://www.bcogc.ca/node/14704/download

[11] https://www.bcogc.ca/node/11416/download

1298-12 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
1298-13 11. LCA Inputs and Assumptions - General
1298-14 7. SEPA Alternatives
1298-15 17. LCA Inputs and Assumptions - Peak Shaving
1298-16 16. LCA Inputs and Assumptions - Hydraulic Fracturing

water and sand for its operation. The SEIS, however, does not include the GHG emissions from the trains and diesel trucks used to transport the water and sand to the wells. It is our understanding that sand for fracking may come from places as far away as Wisconsin which would incur significant transportation emissions.

The draft SEIS is incomplete - The report has inconsistencies, missing data, or simply incorrect units of measurement. These errors appear in multiple places throughout the document, making it difficult to provide a thorough analysis. In one instance, the report uses inconsistent units of measurement; in calculating the B.C. methane leakage rate, the amount of leaked gas measured in billions of cubic meters is directly compared to the total gas produced in billions of cubic feet. There are also multiple locations of missing data. For instance, CO_2 emission factors for natural gas are indicated merely as placeholder values, with a corresponding note that the data had been requested. These few examples raise obvious questions about the completeness and accuracy of the SEIS. We recommend a robust revision and reissue of the document to include complete and accurate information, as well as a new period for public comment.

1298-16 cont'd 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1298-17 10. LCA Calculations

0663-1 23. General Support

GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

RECEIVED
NOV 7 2018
Puget Sound
Clean Air Agency

November 5, 2018

Puget Sound Clean Air Agency
1904 Third Ave, Suite 105
Seattle, Washington 98101

Subject: Public Comment on DSEIS, PSE LNG Project

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. This includes my agreement with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the environmental and air quality benefits of replacing diesel or bunker fuel currently used by the maritime industry with LNG fuel. Switching from diesel to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%.

The LNG facility will also generate important economic benefits for all South Sound residents, which I am one. It will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s), so the LNG facility can be completed as soon as possible.

Sincerely,

Michael E. Hutchinson, LG, LHG
Senior Principal Hydrogeologist
Chief Executive Officer
GeoEngineers, Inc.

[03:51:05] Is Todd Iverson here?

Todd: Yes. Good evening. My name is Todd Iverson. And I'm sorry I don't have a song prepared. But I'm a longshoreman at the Port of Tacoma, and I'm here to represent the 1,500 longshoremen at the Port of Tacoma. We support TOTE's transition to LNG because 1) is they're a great employer, and they've taken the strides to make the investments to do this. Secondly, as I was coming here tonight, I told one of our crane drivers at the union hall, I said I'm heading up there to the thing, and he goes, "Thank you. I'm a crane driver. I have to sit next to the smoke stacks."

Currently, all of the vessels pretty much use bunker fuel. It's a dirty, ugly, bad substance that has a lot of particulates.

[03:52:00] We know the LNG is better for us. We know LNG is not perfect. I don't dispute a lot of what's been said here tonight. We hope that the findings show that it's an alternative for now. We know it's not the end product. I, ultimately, hope that Elon Musk events some battery that can power those vessels. But right now, that technology is not there. And this is the bridge to that point. I'm also speaking as a father. I have three little boys, and everything I do, I want to make sure their dad has a job, so they can eat tonight and tomorrow and the next day.

But, most important, that they inherit an earth that is going to be for them. So, I encourage you guys to A) pass this permit, but also, hold PSE accountable. Make sure that they use the best technology to get the best environmental results and move us forward. And I thank you for your time. And feel free to contact us for anymore information. Thank you.

Steve: Thank you.

1980-1 23. General Support

From: Andy Mayer
To: Public Comment
Subject: PSE LNG facility comment
Date: Thursday, October 25, 2018 5:44:22 PM
Attachments: image001.jpg
Skagit Business Alliance re PSE LNG facility.pdf

PSCAA,

Please find attached a comment letter from the President of the Skagit Business Alliance, of which the Mount Vernon Chamber is a member.

Thank you,

Andy

Andrew T. Mayer
President/C.E.O.
Mount Vernon Chamber of Commerce
andy@mountvernonchamber.com
360 428-8547

Skagit Business ALLIANCE

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle WA 98101
Re: Tacoma LNG Facility
publiccomment@pscleanair.org
October 25, 2018

Puget Sound Clean Air Agency;

On behalf of the Skagit Business Alliance I am writing to provide our comments and to express support for PSCAA to issue the necessary permits for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is clearly the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone, land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Skagit Business Alliance is a coalition of representatives from the Anacortes, Burlington, Concrete, La Conner, Mount Vernon and Sedro-Woolley Chambers of Commerce, the Skagit/Island Counties Builders Association (SICBA) and the North Puget Sound Association of Realtors (NPSAR).

Mount Vernon Chamber of Commerce · SICBA · Sedro-Woolley · Anacortes Chamber of Commerce · Concrete · Burlington Chamber of Commerce · North Puget Sound Association of REALTORS® · La Conner

Skagit Business ALLIANCE

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Sincerely,

Christina Jennings

Christina Jennings, President

Skagit Business Alliance

The Skagit Business Alliance is a coalition of representatives from the Anacortes, Burlington, Concrete, La Conner, Mount Vernon and Sedro-Woolley Chambers of Commerce, the Skagit/Island Counties Builders Association (SICBA) and the North Puget Sound Association of Realtors (NPSAR).

MOUNT VERNON CHAMBER OF COMMERCE · SICBA · SEDRO-WOOLLEY · ANACORTES CHAMBER OF COMMERCE · CONCRETE · Burlington CHAMBER · North Puget Sound Association of REALTORS® · La Conner

[00:06:00] Rich Voget, Nancy Shimeall, and Chris Chapin. Mr. Eric Johnson.

Eric: Thank you very much. Good afternoon. My name is Eric Johnson. I'm the executive director of the Washington Public Ports Association. That's the association based out of Olympia that represents the port districts of the state of Washington. And I'm here in support of finalizing the draft environmental impact statement for this facility and issuing the permit for this facility once that DEIS becomes final. LNG is a lot cleaner fuel than bunker fuel, which is what it replaces. And we have taken the additional step now of studying the lifecycle impact of that fuel. And the study shows that, on balance, we're better off.

The air in this harbor will be cleaner with this facility than it will be without this facility. Ports across our state are striving to continuously improve our environmental practices. And moving to cleaner fuels is one part of that process. And transitioning to cleaner vessels is something that the global shipping fleet is evolving towards.

[00:07:00] If we, in the Pacific Northwest, want to be a part of that transition, we're going to need facilities like this one to be available to shipping lines like TOTE who want to use them. So, in closing, I would urge the air agency to finalize the EIS and issue the permit for the facility. Thank you very much.

1973-1 23. General Support

From: Bonnie Millikan
To: Public Comment
Cc: Jason Hagey; Gary Chandler; Kris Johnson
Subject: Ltr to Puget Sound Clean Air Agency
Date: Monday, November 12, 2018 2:47:51 PM
Attachments: image001.png
Ltr Puget Sound Clean re LNG Project 11.12.18.pdf

Attached you will find our letter of support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma and to urge the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) to allow construction of this important facility to continue.

Please let us know if you have any questions.

Thank you.

Bonnie Millikan / Executive Assistant to the President & Office Manager
***AWB** / PO Box 658, Olympia / WA 98507-0658*
360.943.1600 / m 360.280.4629

AWB
PO Box 658 / Olympia, WA 98507-0658 / 1414 Cherry St. SE / Olympia, WA 98501 / 360.943.1600 / awb.org

November 12, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Re: Draft Supplemental Environmental Impact Statement (SEIS), PSE LNG Project

On behalf of the Association of Washington Business (AWB), I write to express support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma and to urge the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) to allow construction of this important facility to continue.

AWB is the state's oldest and largest statewide business association representing nearly 7,000 employers and more than 1 million employees. AWB serves as both the state's chamber of commerce and state manufacturing association.

We are pleased to see the release of the draft Supplemental Environmental Impact Statement (Draft SEIS) and appreciate the work put forward by the Puget Sound Clean Air Agency. This letter reflects my comments in support of the PSCAA finalizing its SEIS consistent with the draft issues Oct. 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

Our members are continually striving to reduce their carbon footprint and expand economic opportunity in every part of the state. The PSE LNG project will further both of these objectives.

The facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port of Tacoma, along with the economic activity from an additional 125 permanent jobs the project will create in the region. In addition, it will help local businesses remain competitive by providing a needed supply of LNG for marine vessels that will soon be reconfigured to run on this clean alternative to conventional fuels.

This is the right place for this kind of job creation. The port is an established industrial area, and this project is consistent with the types of uses located in the area. The City of Tacoma has reviewed the land where this project is located and zoned it for exactly this type of industrial facility.

Washington is one of the most trade-driven states in the country. The Port of Tacoma has long been an economic driver, not only for Tacoma and Pierce County but also for the entire state, moving products that are made here to export markets around the world. When it's finished, this state-of-the-art facility will be a competitive advantage for the Northwest Seaport Alliance and for the state of Washington.

In addition to job creation, this project will contribute significant environmental benefits as documented by the Draft SEIS. Switching ships to LNG reduces greenhouse gas emissions by nearly 15 percent and reduces visible particulate emissions from ships by more than 85 percent, improving air quality and reducing health risks.

Finally, increased reliability to employers and residential consumers is an additional benefit that would result from the project. On Oct. 9, many of PSE's major customers were required to curtail their use of natural gas when a major pipeline supplying gas to Washington state ruptured and the supply was turned off. This negatively impacted business operations and served as an example of how the project will provide benefit to the community. With the LNG facility in production, the mandatory curtailment could have been avoided.

For all of these reasons, we offer our strong support of PSE's LNG facility at the Port of Tacoma. It will create good jobs, reduce greenhouse gas emissions and provide our region and state with an important competitive advantage.

Sincerely,

Kris Johnson



President & CEO

0721-1 23. General Support

HONDA

American Honda Motor Co., Inc.
1919 Torrance Blvd.
Torrance CA 90501-2746
Phone (310) 783-2000

November 1, 2018

Puget Sound Clean Air Agency (PSCAA)
Attn: Public Comment
1904 3rd Ave Suite 105
Seattle, WA 98101

RECEIVED
NOV 6 2018
Puget Sound
Clean Air Agency

Subject: TOTE MARITIME ALASKA LNG PROJECT

Good afternoon,

I am writing as the head of logistics at Honda, longtime partners with TOTE Maritime. We have followed with great anticipation TOTE's conversion to LNG as it aligns very closely with our corporate initiative to leave the world better than we find it today (our "Blue Skies for Our Children" initiative).

I lead the teams responsible for shipping automobiles from factories around the world to our dealerships in the U.S. As you can imagine this activity creates a significant carbon / GHG footprint, which we are striving to reduce. We do this by collaborating with likeminded Ocean Carriers, Railroads and Trucking Partners who are proactively seeking to reduce the carbon footprint and GHG emissions related to their trade.

I was concerned to hear of delays in TOTE Maritime's conversion plan when I last inquired. It seems as though the environmental review has taken on a life of its own and has gone on far too long already. I have seen this happen in other regions to the detriment of the Port's competitiveness and ability to serve the growing demand of shippers (like Honda) for clean air alternatives. Further delay puts the port of Tacoma (in my opinion) at a competitive dis-advantage while continuing to un-necessarily pollute our environment. As I understand them, the benefits of this conversion are quite clear:

- Nearly 14% reduction in GHG
- The practical elimination of particulate emissions
- 100% reduction in SOX
- 90% reduction in Nitrogen Oxides

We can all be proud of these outcomes. As a company concerned with the environment we leave our children and grandchildren, I felt it important to express my concern regarding the delays and urge you to move swiftly forward with the approvals necessary to enable TOTE's LNG conversion plan.

Sincerely,

AMERICAN HONDA MOTOR CO., INC.

Chuck Kendig
AVP Automobile Operations / Logistics

0344-1 23. General Support

maxum PETROLEUM

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OCT 26 2018
Puget Sound
Clean Air Agency

Maxum Petroleum
[illegible] 11th Avenue SW
Seattle, WA 98134
P 206.623.3480
F 206.623.3485
www.maxumpetroleum.com

October 22, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

RE: PSE LNG Project

To whom it may concern:

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Maxum Petroleum is a marine diesel fuel and lubricant provider. Locally, we have terminals on the water, barges, vessels and trucks that we use to distribute our products to tugs, vessels and ships throughout Puget Sound. Additionally, we have operations on the Columbia River, San Francisco/Oakland and LA/ Long Beach, which provide the same mode of distribution to the maritime community. Several of our clients are and have begun to transition their vessels propulsion system to operate on LNG due to the environmental and regulatory pressures outlined in this letter. The facility at Puget LNG is an important supply source for these vessels to receive the services they require to operate. This specifically includes my concurrence with the conclusion about the environmental benefit of replacing transportation bunker fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing bunker fuel currently used by the maritime industry with LNG fuel. Switching from bunker to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%. It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in.

It is also important to note that LNG powered ships will substantially exceed the North American Emission Control Area requirements established by the International Marine Organization's (IMO). The IMO regulations have required a reduction in the bunker fuel sulfur content from 3.5 percent to 0.5 percent. Both US EPA and the US Coast Guard are enforcing these fuel regulations, which have been estimated by EPA to reduce mortality by as much as 30,000 people per year. TOTE has made the commitment to use LNG fuel, which provides substantially greater benefits than even the IMO regulations mandate. Maxum Petroleum has assisted its clients that have already moved from bunker fuel to Ultra Low Sulfur diesel fuel over the last decade. In each case, the clients have placed their environmental stewardship programs at the forefront of their company's core values and have

remained not only competitive but also safe and efficient operators. These shipping lines as well as several others that call in Puget Sound are incorporating LNG propulsion systems into their new build programs. The future primary source of fuel for bunkering vessel is LNG.

Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

Sincerely,

Dan Kovacich
Vice President, Marine Division
Maxum Petroleum

0655-1 23. General Support

WBA
Whatcom Business Alliance
Facilitating Business Success & Community Prosperity

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NOV 1 2018
Puget Sound
Clean Air Agency

October 22, 2018

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle WA 98101
Re: Tacoma LNG Facility

Puget Sound Clean Air Agency;

*I am the President of the **Whatcom Business Alliance.** We are a membership organization in Whatcom County that has business members from every industry that do business all over the state and world. We also have municipalities and our local Port of Bellingham as members. I am writing on behalf of our organization to provide comments and express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.*

The Port of Tacoma is the right place for a facility like this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

2423 E. Bakerview Rd., Bellingham WA 98226
360.746.0418 www.WhatcomBusinessAlliance.com

WBA
Whatcom Business Alliance
Facilitating Business Success & Community Prosperity

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. ***Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%.*** *This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.*

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

I thank you on behalf of our membership for your consideration of this important issue.

Sincerely,

Tony Larson, President
Whatcom Business Alliance

Cc: WBA Board of Directors

2423 E. Bakerview Rd., Bellingham WA 98226
360.746.0418 www.WhatcomBusinessAlliance.com

[03:53:00] Virginia Lohr?

Virginia: I'm Virginia Lohr. I'm a volunteer with Citizens' Climate Lobby, which is working for a livable future. An analysis that will have an impact on the future of humanity should not be based on an isolated bubble like just the city of Tacoma. So, I thank you, the agency, for requiring that there be a supplemental environmental impact statement that evaluates the emissions, including the upstream ones. My comments here will focus on just one problem that I see with the draft statement, though there are, obviously, many that we've heard.

And this one has also been alluded to. The project should not be allowed to go ahead with the assumption that BC gas has less leakage of methane than other sources.

[03:54:00] One reason is that leakage numbers for BC have been called into question. Also, individual sites will vary. It can't be an assumption that every site in BC will be acceptable. "Unexpected ruptures", which is what PSE told us was the gas pipe breakage recently in BSC should be expected. Did you know that that was a 36 inch pipe that broke? And did you know that about 40 feet away was a 30 inch pipe? We are very fortunate that that accident, that unexpected rupture, was not extremely worse. I assume that that has a little effect on leakage rates of methane in BC, when that happens.

And as you've also heard about the IPCC report that was released this month on the dire nature of climate change.

[03:55:00] This should weigh heavily on those making these decisions, for the next 40 years, as we've heard from the children before me. At the very least, this draft statement should be revised to use methane leakage numbers from independent researchers such as the Davis Suzuki Foundation and use a reasonable life span for methane and something that is in keeping also with the life span of this proposed project. And I stand with the Puyallup Nation in their opposition to the LNG facility. Thank you.

Steve: Thank you. Betsy Seaton?

1235-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1235-2 13. LCA Inputs and Assumptions - Natural Gas Source
1235-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

Steve: Thank you. Next is Melissa Malott.

Melissa: Hello. I'm Melissa Malott. I'm the executive director of Citizens for a Healthy Bay. We engage people in the cleanup, restoration, and protection of Commencement Bay and surrounding waters. CHB stands in opposition to this project. In coming to this unanimous decision, we found three things. First of all, the LNG project will be worse for climate emissions. Lots of people in the room tonight do not understand this. The SEIS only looks at climate emissions after methane emissions lose their potency. So, at a time that we must be dramatically reducing emissions, this project is worse than the status quo.

For that reason, we find that it poses unacceptable risks to Commencement Bay and Tacoma. Second, we find that the SEIS, as drafted, is incomplete and misleading.

[04:08:00] I've worked in government before. I've worked with government my entire career. I believe in government. But I am so disappointed in this. This fails to inform the public of the climatic impacts of this project. It's dishonest as drafted, and it hides the most important information. You must disclose the climate impacts of the LNG project during the life of the project because that's when climate emissions matter because that's when we have to be reducing them. Please pull this back. Update it with complete and accurate information and reissue it for public comment.

Finally, our third finding is that the Puyallup Tribe of Indians was excluded from this project at a critical stage in the process. The city of Tacoma had a legal responsibility to meaningfully involve the tribe in consultation, at early stages of the project. We did an open records request of the city and found that they did not have the records to show that they meaningfully consulted the tribe under the requirements of the Land Claim Settlement Act.

[04:09:05] Please do not perpetuate the illegal denial of meaningful consultation with the tribe about actions that impact tribal resources. Take time to address the flaws in this process. Consult with the tribe about the information and the SEIS and the significant risks to the tribe's resources. Then, please revise and update the SEIS with full and complete information and rerelease it to the public for public comment. Thank you.

1190

1190-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1190-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1190-3 5. Regulatory Framework

From: Melissa Malott
To: Public Comment; Betsy Wheelock
Subject: Letter on LNG project SEIS from Citizens for a Healthy Bay
Date: Friday, October 26, 2018 1:10:27 PM
Attachments: Letter-to-PSCAA_10-25-2018.pdf

Hello,

Please see the attached letter.

Sincerely,

Melissa Malott

1304-1 22. General Opposition
1304-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

Citizens for a Healthy Bay

535 Dock Street
Suite 213
Tacoma, WA 98402
Phone (253) 383-2429
chb@healthybay.org
www.healthybay.org

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Kelly McCord
Sheri Tonn

A tax-exempt
501(c)(3) Washington
nonprofit corporation

October 25, 2018

Puget Sound Clean Air Agency (PSCAA)
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101
publiccomment@pscleanair.org

Hello,

Thank you for the information contained in the draft Supplemental Environmental Impact Statement (SEIS) for the Tacoma Liquefied Natural Gas Project (LNG project).

Citizens for a Healthy Bay (CHB) is a 28-year-old organization whose mission is to represent and engage people in the cleanup, restoration, and protection of Commencement Bay, its surrounding waters and natural habitat. We are a 501(c)3 nonprofit providing practical, solutions-based environmental leadership in the Puget Sound area. We work side-by-side with residents, businesses, and government to prevent and mitigate pollution and to make our community healthier and more vibrant.

We commented on the original draft EIS for this project in 2015, and had concerns that were addressed by Puget Sound Energy's modifications to the project. After that, we were neutral on the LNG project. For the SEIS, CHB's Policy and Technical Advisory Committee, staff, and board have reviewed information in light of recently published reports on climate change, and we are alarmed by the new information available on this project.

Within the SEIS is information that shows the LNG plant would have higher climate impacts than the no action alternative for the life of the project, and CHB finds that the LNG project poses unacceptable risks to Commencement Bay and the Tacoma environment. We also find important parts of the SEIS to be incomplete and misleading for the public. By unanimous vote of our board of directors, CHB opposes any further development of the LNG project. We urge PSCAA to revise and update the SEIS and re-release it for public input.

The most alarming information in the SEIS relates to the amount and impact of methane emissions during the life of the project. A key step to PSCAA's conclusion that the LNG project is better than the no action alternative is evaluating the impacts of the methane emissions after 100 years, at a time when their potency would be significantly diminished. At 100 years, after the methane emissions have lost most of their potency, the SEIS says the emissions from the plant would only be 4 or 5% better than the no action alternative. However, because methane's potency is much higher in the first few decades it is emitted,

examining the impact of methane emissions on a shorter timeline would show the climate impact of the LNG plant to be much worse than the no action alternative.

Climate change is an immediate local and global concern. The 0.5 degrees Celsius increase we have already experienced has impacted our Puget Sound communities and environment. These changes affect the planet as a whole and impact Commencement Bay. Ocean acidification is one example of a global problem from climate change impacting the Puget Sound and Commencement Bay; ocean acidification is hurting shellfish and the people who eat or sell shellfish. We know that climate change impacts Puget Sound and Commencement Bay, and that cutting greenhouse gas emissions now must be a global and local priority.

Recent reports about the progress of climate change indicate that the planet is experiencing rapid warming. Without drastic, unprecedented cuts to greenhouse gas emissions, the planet will warm by more than 1.5 degrees Celsius in the next few decades, and potentially 4 degrees Celsius by 2100. The impact of changes beyond 1.5 degrees Celsius is unacceptable to us. It will massively impact the Puget Sound fishery and ecosystem, and change our communities and economy in ways we cannot yet imagine. To prevent more than 1.5 degrees warming, scientists report that global greenhouse gas emissions must fall to zero by 2050 and then go negative. Cutting greenhouse gas emissions to zero by 2050 is a massive task, and will take drastic, unprecedented measures to accomplish.

With the scale of change that needs to happen in mind, the LNG project is a step in exactly the wrong direction. Increasing methane emissions, which are 86 times more potent than carbon dioxide as a greenhouse gas, in the next few decades is the opposite of what we should be doing. This LNG project would release hundreds of thousands of tons of a potent greenhouse gas at the exact time when we must drastically reduce greenhouse gas emissions. It is a bad idea and should not proceed.

We are also extremely concerned that this SEIS is incomplete and relies on outdated, inaccurate information and is misleading for the public. A critical table in the analysis appendix, Table C.1. uses placeholder figures rather than actual data. Although we have requested the accurate data for this table, it has not been provided.

In the SEIS, the global warming potential of methane and nitrous oxide is assessed based on an outdated standard (AR4) from 2007. The newest standard, AR5, shows that methane has a greater impact on climate change than previously thought. Bizarrely, the SEIS discusses the updated standard and includes the figures for it in its report, but then chooses to use the outdated standard from 2007 for its analysis.

Additionally, the conclusions in the SEIS rely heavily on the assertion from PSE that the plant will only use natural gas from British Columbia. The SEIS fails to provide any analysis or discussion of the potential greenhouse gas emissions if the plant's natural gas comes from another source, such as the United States or other Canadian provinces. As a result, it is impossible to assess the true impact of the project in the likely scenario that the natural gas will be sourced from multiple locations. The SEIS provides an incomplete picture of greenhouse gas impacts because it insisted on an analysis restricted to a certain geography.

Further, the SEIS fails to indicate how the LNG plant scenario compares to the no action alternative in terms of global warming impacts during the 40 year life of the project. The SEIS relies on a 100-year timescale to assess greenhouse gas emissions even though the life of the plant is only anticipated to be 40 years. The public deserves to know the true impact of the project during its lifespan, or, at least, during a timeframe that is relevant to the important changes that need to be made to address climate change. Why have an SEIS that is scoped to explore the greenhouse impacts of a project and then not disclose the greenhouse impacts in a relevant way?

Finally, we are concerned about the exclusion of tribal communities at a critical stage in the process. The City of Tacoma had a legal responsibility to meaningfully involve the Puyallup Tribe of Indians in consultation at the

1304-2 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1304-3 3. Outside of SEIS Scope
1304-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
1304-5 13. LCA Inputs and Assumptions - Natural Gas Source
1304-6 12. LCA Inputs and Assumptions - Global Warming Potential Value
1304-7 5. Regulatory Framework

early stages of this project. CHB did an open records request earlier in 2018, and found that the City did not have records to show it followed the meaningful consultation requirements under the Land Claims Settlement Act. Please do not perpetuate the illegal denial of meaningful consultation with the Puyallup Tribe about actions that impact tribal resources. Take the time to address the flaws in this process. Consult with the Tribe about the information in the SEIS and the significant risks to the Tribe's resources. Then, please revise and update the SEIS with full and complete information, and to re-release it to the public for public comment.

In its current state, the SEIS is incomplete, inaccurate and unreliable. We stand in opposition to this project. We encourage you to pause this process and reissue a complete SEIS on which the public can comment. Thank you for your consideration. Please do not hesitate to contact me with any questions about this letter.

Sincerely,



Melissa Malott
Executive Director, Citizens for a Healthy Bay
mmalott@healthybay.org, (253) 383-2429

CC: Victoria Woodards, City of Tacoma Mayor
Members of the City of Tacoma City Council
Members of the Puyallup Tribe of Indians Tribal Council
Members of the Puget Sound Clean Air Agency Board of Directors
Jay Inslee, Governor of Washington State
Rep. Jake Fey, Washington State House of Representatives
Rep. Laurie Jinkins, Washington State House of Representatives
Sen. Jeannie Darnielle, Washington State Senate
Hartleigh Caine, TOTE Maritime Alaska

Steve: Thank you. Before we call the next speaker, let me just give you the next five after that. Kathy Lawhon, David Perk, Alex Hofeling, Renee Cournoyer, Josh Clearman. So, next up would be Mark Martinez.

Mark: Thank you. And please tell me when I take up my two minutes, as was stated before.

[04:41:00] My name is Mark Martinez. I live in Tacoma's fabulous east side. I'm here tonight representing the Pierce County Building and Construction Trades Council. The council consists of 16 craft unions and about 6,000 skilled union workers that make Tacoma and Pierce County their home. The council urges the Puget Sound Clean Energy Agency to adopt the draft SEIS as written and issue the necessary permits to put 400 of our members to work. LNG powers our economy and heats our homes, heats our schools, heats our businesses, and heats the entertainment venues that we all enjoy.

Replacing diesel with LNG, on this project, is said to reduce or will reduce greenhouse gas emissions by 13.5% and sulfur emissions by 85%. Your own draft SEIS states, when evaluating direct, upstream, and end use greenhouse gas emissions, replacing the diesel propulsion engine with a pure LNG propulsion engine results in reduced lifecycle greenhouse gas emissions.

[04:42:13] Your own quote. So, what's the alternative? We get to burn more diesel. On behalf of our 6,000 members and our 16 craft unions, we ask the Puget Sound Clean Air Agency to adopt the draft SEIS as written and issue the air permits to put people to work. One more thing, I hope everybody has a safe drive home.

From: Andy Mayer <andy@mountvernonchamber.com>
Sent: Thursday, October 25, 2018 1:32 PM
To: Public Comment
Subject: Public Comment Re: Tacoma LNG Facility
Attachments: Mount Vernon Chamber - Re Tacoma LNG Facility.pdf

Puget Sound Clean Air Agency,

Please find the letter from the Mount Vernon Chamber of Commerce attached.

Thank you,

Andy

Andrew T. Mayer
President/C.E.O.
Mount Vernon Chamber of Commerce
andy@mountvernonchamber.com
360 428-8547

MOUNT VERNON CHAMBER OF COMMERCE

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle WA 98101
Re: Tacoma LNG Facility
publiccomment@pscleanair.org

Puget Sound Clean Air Agency:

I write on behalf of the **Mount Vernon Chamber** to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone, land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Regards,

Andrew T. Mayer
President & C.E.O.

Port of Tacoma

P.O. Box 1837
Tacoma, WA 98401-1837
www.portoftacoma.com

November 8, 2018

Craig Kenworthy
Executive Director
Puget Sound Clean Air Agency
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

Dear Craig Kenworthy:

The Port of Tacoma (Port) is pleased to provide these comments on the Draft Supplemental Environmental Impact Statement (DSEIS) for Puget Sound Energy's proposed Tacoma Liquefied Natural Gas (LNG) plant. The port is encouraged by the focus and rigor of the authors and the Puget Sound Clean Air Agency (PSCAA) as lead agency applied to this DSEIS.

The Port is pleased that the SEIS confirms what we have long believed—that LNG, while not a perfect solution, is a step in the right direction as the maritime shipping industry improves its impact on the environment.

One day, renewable technology may be able to replace fossil fuels in the shipping industry. But that day is not now, and won't be for many years. In the meantime, LNG is a better choice – as evident by the SEIS.

The maritime industry is investing heavily in LNG as a better alternative to the heavy fuel currently used in ships. Most new, large ships are being built with dual fuel capability and will be able to use LNG.

Exemplifying this, and largely for environmental reasons, Carnival Cruise Lines is making the transition from traditional fuels to LNG. Also, BC Ferries in Canada is now operating on LNG.

This facility will be a critical piece of our Port infrastructure. It being in the Tideflats and close to our terminal operations will help the Port remain competitive into the future. Local investment in LNG means that in the future, cleaner ships will call our port and the use of LNG will improve local air quality. Emissions of particulate matter, a clear human health hazard, will be very substantially reduced by switching to LNG. Those of us living through the last two summer fire seasons know the value of reducing particulate emissions. In fact, the ports of Seattle, Tacoma and Port Metro Vancouver have worked in partnership for over a decade to collectively reduce emissions associated with our operations. While the focus has been on trucks and yard equipment, moving ships to cleaner fuels is a significant step forward. Switching to LNG will mean cleaner air for the men and women working in the Tideflats and the local community.

The port is encouraged that while the authors of the study took a conservative approach to the analysis, they still demonstrated that the life cycle Greenhouse Gas (GHG) emissions would be reduced by displacing the use of diesel fuel with natural gas. And while that reduction is not as steep as a less conservative approach may have found, it is important nonetheless.

The Port provides the following specific comments:

- PSCAA used the correct approach to modeling emissions: The approach PSCAA used in doing this analysis is consistent with the approach prescribed in the Kyoto Protocol, Paris Climate Accord, U.S. Environmental Protection Agency, Washington State Department of Ecology and its own policies. To deviate from that approach would constitute policy making via project analysis, which is inconsistent with Chapter 34.05 RCW, Administrative Procedures Regarding Rule Making, among others.
- Tacoma Power vs. Washington State Emission Factor: Tacoma Power produces some of the lowest climate footprint electricity in the state (or in the world, for that matter). We are very proud of their efforts on this front and believe the final analysis should include Tacoma Power's actual GHG emission factor and not the state average. Further, the Port pays a monthly premium to Tacoma Power to purchase electricity from their renewable portfolio. TPU has been a leader on this front for years. Please use their specific GHG emission factor within the final analysis. While it likely will not change the numbers significantly, it will give Tacoma Power their due credit for producing electricity with a very low GHG footprint.
- Dictating Commodity Source: Normally the Port would strenuously oppose any suggestion of dictating where a commodity is purchased and restricting free and open markets. However, given the current federal administration's abandonment of the methane standards for the oil and gas industry and British Colombia's (BC) care and attention to the matter, we understand why the authors suggested restricting gas purchases to BC.

Again, thank you for the opportunity to comment on this DSEIS. Overall, we believe the authors and PSCAA did an excellent job of focusing on the specific question at hand and applying a rigorous approach to a difficult modeling problem. The Port of Tacoma remains firmly committed to helping the maritime industry reduce the negative impacts to air quality and human health, as well as reduce GHG emissions through multiple efforts, including switching to cleaner fuels.

Sincerely,

Port of Tacoma Commission

Don Meyer
President

Don Johnson
Secretary

John McCarthy
First Assistant Secretary

Dick Marzano
Second Assistant Secretary

cc: Mayor Woodards
City of Tacoma Councilmembers

0734

0734-1 23. General Support
0734-2 23. General Support
0734-3 23. General Support

Carole: Thank you. The next group is David Mills, Lisa Simmons, Bliss Moore, William S. Clark, and Holly I think it's Brewer, possibly Drewer. So, if you could do two minutes that would be great. Thank you.

David: I'll do my best. Good afternoon. I'd like to thank the Puget Sound Clean Air Agency for hosting this important public comment opportunity. My name is David Mills. I'm senior vice president for policy and energy supply for Puget Sound Energy. I'm the guy responsible for ensuring the lights are on and the heat is running for millions of people every day by developing and operating a diverse portfolio of energy resources to meet the energy demand of an economically vibrant and growing region. I'm here today to talk to you, specifically, about the Tacoma LNG draft SEIS, which specifically addresses greenhouse gas.

However, I want to emphasize how important this project is to improving air quality, in our community, by providing substantial reductions in particular matter, sulfur dioxides, and oxides of nitrogen.

[01:25:09] This is our home, and we care deeply about it. With this project, we have the opportunity to signify and significantly reduce emissions with cleaner alternatives to diesel and other fuels. PSE's partnership with TOTE Maritime will make this kind of impact. When TOTE's first ship leaves Tacoma for Alaska fueled with LNG, it will result in a material reduction of harmful air pollutants. In concert with the vessels' owners, our LNG facility will create the greenest shipping fleet here on the west coast. Transportation is the single largest source of carbon in our entire state.

Imagine the positive impact on our state's overall carbon emissions, if more ships and trucks were powered with LNG. With the Tacoma LNG facility, we have the opportunity to create a better and cleaner energy future. I have the following very quick, specific comments.

[01:26:00] PSE appreciates the care and diligence that PSCAA brings to the mission of cleaning our air shed and work that PSCAA has put into the supplemental draft EIS. We also look forward to the Tacoma LNG facility being a positive agent of change and reducing greenhouse gas emissions in our community and the region. Our company recognizes that climate change concerns are real and appreciates that PSCAA has comprehensively considered the lifecycle emissions in the draft SEIS. PSE supports the SEIS's

evaluation and the full range of greenhouse gas effects.

We endorse the SEIS's consistent use of global warming metrics that align with the Paris Climate Agreement, and that have been adopted and used by the EPA, Department of Ecology, and setting national, regional, and statewide greenhouse gas reduction goals. We at PSE concur with the draft SEIS conclusion that displacing diesel fuel with cleaner natural gas reduces net greenhouse gas reductions. PSE will comply with the detailed state and federal greenhouse gas reporting requirements, at this facility, just as we do at all of our facilities.

[01:27:05] We look forward to working with our regulators, so that the natural gas that we use at the facility results in a variety of environmental benefits, including a net reduction in greenhouse gas emissions. Thank you for your diligence and attention to detail, in this process.

1947-1 23. General Support

From: Meredith Neal
To: Public Comment
Subject: Approve Tacoma LNG
Date: Tuesday, November 20, 2018 7:31:52 PM
Attachments: MIC letter for PSCAA LNG SEIS.pdf

Please see my attached letter and approve Tacoma LNG facility.

Thank you,
Meredith

Meredith Neal
Director, Manufacturing Industrial Council
A Program of the Tacoma-Pierce County Chamber
950 Pacific Avenue, Suite 300
Tacoma, WA 98402

Main: 253.627.2175
Mobile: 253.254.2767

meredithn@tacomachamber.org
micsouthsound.com

The Voice For The Manufacturing, Industrial and Maritime Community in the South Sound

November 20, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Subject: Tacoma Liquefied Natural Gas (LNG) facility SEIS

To Whom It May Concern;

The Manufacturing Industrial Council for the South Sound urges the Puget Sound Clean Air Agency (PSCAA) to:

- Approve the Final SEIS for SEPA compliance with no proposed mitigation
- Issue a Final Order of Approval for the Proposed Action
- Issue the permit(s) required to complete the Puget Sound Energy (PSE) Tacoma Liquified Natural Gas (LNG) Facility at the Port of Tacoma without further delay.

We all want a cleaner future. Manufacturing, industrial and maritime businesses in the Tacoma Tideflats are working together with agencies like yours to ensure that we are safeguarding and improving people's lives, creating a sustainable environment, and providing the jobs that anchor our local and state economy.

We have a wonderful resource here with the Port of Tacoma and the Tacoma Tideflats area, with over 40,000 jobs. These jobs are good living wage jobs, jobs that you can truly support a family with. The port is a major economic driver regionally and statewide, and supplies most consumer goods to Alaska. We need to make sure that our port remains competitive and having the preferred fuel source available for maritime trade is an important step in keeping global trade lines open.

In the PSCAA 2014-2020 Strategic Plan, Goal 1 is to "Protect public health and the environment from air pollution." Objective 1.2 is to "Reduce transportation emissions, especially diesel particulate, in highly impacted locations." Delaying the construction of this facility and delaying issuing of the permit(s) will mean added diesel and heavy particulates and greenhouse gases in our local neighborhood air quality.

As a longtime Tacoma resident, I am concerned about the air impacts from the bunker fuel that large vessels visiting the Port of Tacoma currently burn, air that my family breathes, including my children and my aging parents who both are identified as sensitive populations. I applaud shipping lines like TOTE who are meeting and exceeding federal regulations to improve local air quality by transitioning to LNG as a cleaner burning fuel, and plugging into shore power while they are at the dock to improve neighborhood air quality.

950 Pacific Avenue, Suite 300, Tacoma, WA 98401 • Telephone: 253.254.2767 • hello@micsouthsound.com •

The Manufacturing Industrial Council for the South Sound is a program of the Tacoma-Pierce County Chamber

The Tacoma LNG facility has already been through a thorough Environmental Impact Statement (EIS), along with the current Draft Supplemental EIS (SEIS). Both the original EIS and the Draft SEIS clearly document the benefits of this facility, including a reduction in greenhouse gases and heavy particulate.

The environmental and health benefits of LNG when used instead of bunker fuel/heavy marine diesel are very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter federal emission standards.

We ask that you issue the final Order of Approval for the Proposed Action and release any permit(s) to continue construction on the LNG project.

The PSCAA board of directors has committed to "work to protect public health, improve neighborhood air quality, and reduce our region's contribution to climate change." By allowing the completion of the LNG facility and a cleaner fuel alternative for the maritime industry, you are meeting all of those criteria.

Thank you for your time.

Sincerely,

Meredith Neal, Director
Manufacturing Industrial Council for the South Sound
meredithn@tacomachamber.org
253-254-2767

Steve: Okay. Betsy Seaton?

[03:58:00] Mike O'Brien?

Mike: Hi. My name is Mike O'Brien. I'm a Seattle city councilmember. But I'm here as a board member of the Sierra Club. Earlier this month, the United Nations International Climate Conference released their latest report, and it comes as no surprise that what they said was catastrophic climate change is coming much faster than we thought. They gave us a little over 10 years to radically redefine our economy. Now, the good news was that they told us it was no longer a challenge of physics or chemistry. We figured that part out. We have the technology to change course.

But the big question mark they left for us is do we have the political will to make those changes. It's no longer on the scientists. It's on all of us to make that decision. Now, we can debate the science around what is slightly worse or better, fracked gas versus bunker fuel.

[03:59:00] You all can decide the value of the life of a crane operator who is breathing that bunker fuel versus the value of life of a family who lives near a fracking well and is drinking that contaminated water. But we know that we have solutions that are actually clean that work for everybody. We just need to have the political will to do that. Unfortunately, because of our generation's negligence, we have already left a disaster for our kids and our grandkids to clean up. Some of them are here today. And some of them are already standing up and doing this fight. But this is not a problem they created.

They're going to inherit it from us. They're going to spend significant resources over their lifetime dealing with the catastrophes that are coming and putting resources into solutions. I beg of you, don't make their work harder than it is. Please deny this permit.

[00:29:00] So, the next group of five, we've got Tim O'Donnell, Steve Hoffman, Jordan Royer, Greg Unruh, and Dan Streiffert. And I can tell by the sheer number of people that want to speak, which is fantastic, I'm going to ask you to voluntarily, if you can cut your time back below the three minutes that would be really helpful. Then, everyone that signed up in this session could, actually, at least so far, could potentially speak during the afternoon and won't have to come back. So, Tim O'Donnell.

Tim: All right. And thank you for your time today. My name is Tim O'Donnell. I represent the IBW Local 76 in Tacoma and surrounding jurisdictions. I represent 1,300 members. A lot of them have been employed down there at the LNG facility, which has been idle for the past few months. It is a great living wage facility.

[00:30:00] It will help our membership increase their health and welfare and their benefit contributions. With them being idle, we are losing money there. We believe in strong science. We understand the economic concerns or the ecology concerns. I'm an outdoorsman. My family has grown up, since the '20s, on the Pacific Ocean from California to Alaska working there. And we understand the science and the concerns with the environment. But we also understand that this is a bridge fuel, and it's something to help get rid of the fossil fuels and the two ships down there burning diesel.

This past spring, I was in Alaska with the governor of Alaska who is supporting this. This will help our brothers and sisters in Alaska and preserve pollution up there. So, with that, we rise, the IBW and the building trades, as a whole, in support of this project and want to see its continuation. Thank you.

Carole: Thank you. Vincent O'Halloran.

Vincent: Good afternoon. I'm Vince O'Halloran. I represent the Sailors Union of the Pacific. And I'm the vice president of the Puget Sound Ports Council, Maritime Trades Department, AFLCIO.

[02:16:00] I have three quick remarks. So, LNG in Tacoma is a component of the Puget Sound gateway, which will help Washington State maritime compete with Canada's aggressive marketing to take Washington jobs in trade. Canada's increasing investment in expanding LNG facilities will offset any reduced use of LNG in the Puget Sound. Keeping Alaska commerce strongly tied to Washington will grow Washington State jobs and support Washington agricultural business. LNG replaces marine bunker oil in the marine shipping industry struggling to meet carbon reduction goals globally.

The technology is available to minimize methane leakage in the LNG production process to address climate change. And we should focus on this, instead of being stuck with using obsolete fuels, such as bunker oil, which is harmful to workers in the community.

[02:17:04] We encourage a continued process of tribal consultation and recognition of treaty rights. Issue groups come and go, but respect of tribal sovereign nations should be the paramount concern in addressing the impacts of LNG. I thank you for your remarks, and I hope that you move forward with the Tacoma LNG plan. Thank you.

1234-2 23. General Support
1234-2 7. SEPA Alternatives

From:	Guy Occhiogrosso
To:	Public Comment
Cc:	"PSE (Lynn Murphy)"
Subject:	PSE Support Letter
Date:	Tuesday, October 30, 2018 1:42:03 PM
Attachments:	image001.jpg 2018-10-29_PSE LNG Support.pdf

To Whom It May Concern

Please accept this letter of support for the PSE LNG facility.

If you have any other questions, please let me know.

Thank you.

Guy Occhiogrosso
President/CEO

Bellingham Regional Chamber of Commerce
office: 360.734-1330 | direct: 360.746-0738
guy@bellingham.com | www.bellingham.com

CHAMBER OF COMMERCE

October 29, 2018

To Puget Sound Clean Air Agency:

On behalf of the Bellingham Regional Chamber of Commerce, I wish to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma. This project is a great representation of both economic development, energy diversity, and improvements to our environmental stewardship.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone, land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Regards,

Guy Occhiogrosso
President/CEO

119 N Commercial Street, #110 - Bellingham, WA 98225 - 360 734 1330

1296-1 23. General Support

ALWAYS SAFE. ALWAYS READY.

FOSS

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
Attn: Public Comment
1904 3rd Ave, Suite 105
Seattle, WA 98101

14 November 2018

Dear Mr. Kenworthy,

Foss Maritime Company writes in support of Puget Sound Energy's air permit application relating to the construction of a liquefied natural gas ("LNG") facility in the Tacoma Tide Flats. We are a tug and barge company founded in Tacoma, Washington in 1889. We have grown and evolved as the Puget Sound region has grown and evolved. From our humble beginnings in 1889 with a single rowboat, we now have one of the most versatile, advanced fleets of tugs and barges providing harbor towage up and down the West Coast and ocean towage around the world.

Foss has a long and storied history as a responsible corporate citizen of the Puget Sound area, and in every other area in which we operate. Foss developed and operated the first two hybrid tugs in the US industry. We have also been deeply involved as project managers in designing and executing the bunkering operations of the first U.S.-flagged LNG bunker barge, the *Clean Jacksonville*.

We know and care about the role we play in operating our business based on responsible environmental management and with concern for the well-being of our common environment. Consistent with our commitments to sustainability, we support the integration of LNG as a fuel source for our industry. TOTE, our sister company, expects significant environmental benefits from the conversion of its ships to LNG fuel – 100% reduction in SOx, 99% reduction in particulate matter, 90% reduction in nitrogen oxides, and 13.5% reduction in greenhouse gases. TOTE's ability to convert to this cleaner fuel source depends on the approval of the air permit.

As first adopters ourselves, we know that commitment to the environment yields benefits in fits and starts. We cannot afford to wait for the perfect solution if that means we reject interim solutions that take some of the environmental pressure off. Any and every delay in the transition to a cleaner burning fuel means increased air pollution caused by the ongoing use of bunker diesel.

Foss strongly supports the transition to LNG as an important and significant step in the right direction for our communities here in the region.

Regards,

John Parrott | President & CEO
4844-4781-7339, v. 1

Foss Maritime Company
450 Alaskan Way S., Suite 706
Seattle, WA 98104
T 206.281.3800
F 206.281.4702
www.foss.com

From: Tom Pierson <TomP@tacomachamber.org>
Sent: Tuesday, November 20, 2018 6:10 PM
To: Public Comment
Subject: Tacoma Liquefied Natural Gas (LNG) facility SEIS
Attachments: PSCAA Ltr LNG 112018.pdf

November 20, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Subject: Tacoma Liquefied Natural Gas (LNG) facility SEIS

To Whom It May Concern:

The Tacoma-Pierce County Chamber **urges the Puget Sound Clean Air Agency (PSCAA) to issue the permits required to complete the Puget Sound Energy (PSE) Tacoma Liquified Natural Gas (LNG) Facility without further delay.**

Attached is our letter for the record.

Best wishes,
Tom Pierson
President & CEO
Tacoma-Pierce County Chamber
950 Pacific Avenue
Tacoma, WA 98402

Main: 253.627.2175
Direct: 253.682.1736

tomp@tacomachamber.org
www.tacomachamber.org

Working everyday to make the South Sound the best place to do business in Washington State!



JINGLE & MINGLE
December 10 5-8pm
Tacoma Art Museum

Register Today

TACOMA-PIERCE COUNTY CHAMBER

November 20, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Subject: Tacoma Liquefied Natural Gas (LNG) facility SEIS

To Whom It May Concern:

The Tacoma-Pierce County Chamber **urges the Puget Sound Clean Air Agency (PSCAA) to issue the permits required to complete the Puget Sound Energy (PSE) Tacoma Liquified Natural Gas (LNG) Facility without further delay.**

We all want a cleaner future. Manufacturing, industrial and maritime businesses in the Tacoma Tideflats are working together with agencies like yours to ensure that we are safeguarding and improving people's lives, creating a sustainable environment, and providing the jobs that anchor our local and state economy.

We have a wonderful resource here with the Port of Tacoma and the Tacoma Tideflats area, with over 40,000 jobs. These jobs are good living wage jobs, jobs that you can truly support a family with. The port is a major economic driver regionally and statewide and supplies most consumer goods to Alaska. We need to make sure that our port remains competitive and having the preferred fuel source available for maritime trade is an important step in keeping global trade lines open.

In the PSCAA 2014-2020 Strategic Plan, Goal 1 is to "Protect public health and the environment from air pollution." Objective 1.2 is to "Reduce transportation emissions, especially diesel particulate, in highly impacted locations." Delaying the issuing of the permit will mean added diesel and heavy particulates and greenhouse gases in our local neighborhood air quality.

We are concerned about the air impacts from the bunker fuel that large vessels visiting the Port of Tacoma currently burn, air that my family breathes, our members families. We have 1,500 members with thousands of employees who live and breath the air every day. Reducing emission-based particulate has the potential to significantly improve health outcomes for everyone in our County and beyond. We applaud shipping lines like TOTE who are meeting and exceeding federal regulations to improve local air quality by transitioning to LNG as a cleaner burning fuel and plugging into shore power while they are at the dock.

TACOMA-PIERCE COUNTY CHAMBER

The Tacoma LNG facility has already been through a thorough Environmental Impact Statement (EIS), along with the current Draft Supplemental EIS (SEIS). Both the original EIS and the Draft SEIS clearly document the benefits of this facility, including a reduction in greenhouse gases and heavy particulate.

The environmental and health benefits of LNG when used instead of bunker fuel/heavy marine diesel are very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter federal emission standards.

We ask that you approve the permits to move the LNG project forward.

The PSCAA board of directors has committed to "work to protect public health, improve neighborhood air quality, and reduce our region's contribution to climate change." By allowing the completion of the LNG facility and a cleaner fuel alternative for the maritime industry, you are meeting all of those criteria.

Best wishes,

Tom Pierson, President & CEO
Tacoma-Pierce County Chamber

From: Tarika Powell
To: Public Comment; Betsy Wheelock
Cc: Eric de Place; Clark Williams-Derry
Subject: DSEIS comments for Tacoma LNG
Date: Wednesday, November 21, 2018 4:57:31 PM
Attachments: Powell Sightline DSEIS Comments.docx

Ms. Wheeler et al at PSCAA,

Attached please find comments that I am respectfully submitting on the DSEIS for Tacoma LNG.

Thank you,

Tarika Powell | Researcher | Based in Seattle | she/her/hers
Sightline Institute | www.sightline.org | Find us on Facebook and Twitter
T 206.447.1880 x109 | @tarikapowell

Sightline Institute is a think tank providing leading original analysis of energy, economic, and environmental policy in the Pacific Northwest. Take a look at our talking points, or sign up for our news service.

1098-1 4. Language
1098-2 6. Purpose and Need

Tarika Powell
Sightline Institute
1402 Third Ave #500
Seattle, WA 98101

November 20, 2018

DSEIS contact: Betsy Wheelock
Puget Sound Clean Air Agency
1904 Third Ave, Suite 105
Seattle, WA 98101
publiccomment@pscleanair.org
(206) 343-7522 (f)

I am writing to submit comments on Puget Sound Clean Air Agency's Draft Supplemental Environmental Impact Statement (DSEIS) for the Tacoma LNG project. The aim of the supplemental impact statement was to quantify the life cycle air emissions of Tacoma LNG. This work was contracted out to Ecology and Environment, Inc., and Life Cycle Associates, LLC. In terms of project details and a clear understanding of the project's scope, the DSEIS was better prepared than the City of Tacoma's environmental impact statement (EIS), but the DSEIS nevertheless contains substantial errors which resulted in an erroneous conclusion.

Please accept the following comments and requests for correction to the draft SEIS.

Executive Summary

1. **ES.2 SEIS Objectives, Purpose, and Need** – The document uses biased and misleading language at the end of paragraph one: "In addition, PSE is also proposing to load LNG onto trucks or barges for use by other regional markets **seeking a cleaner fuel source**." The SEIS has yet to establish how LNG for marine uses is a cleaner fuel source. Since the SEIS establishes that Tacoma LNG would be a dirty project from a GHG perspective in all but the most exacting scenario, this section should either specify how PSE's project is cleaner (i.e. reducing particulate matter pollution) or omit language that the document does not support.

   While this section is supposed to establish a need for the project, it does not. It notes that the Proposed Action would address a need for new peak-day resources as identified in PSE's 2013 biennial integrated resource plan. The DSEIS ignores the fact that PSE has since prepared a more recent IRP for the Washington Utilities and Transportation Commission, the *2017 PSE Integrated Resource Plan*. The DSEIS should have used the most current information.

1098-3 6. Purpose and Need
1098-4 6. Purpose and Need
1098-5 6. Purpose and Need

The 2017 IRP was available at the time of preparation of the DSEIS, and contains several elements that contradict the claim that the project is needed. First, the majority of the gas PSE uses for peak days comes from Northwest Pipeline firm contracts and the Jackson Prairie underground storage field.[1] Second, PSE is now undertaking improvements to its Swarr LP-Air facility in Renton, Washington, in order to use that plant for additional peaking needs.[2] In fact, PSE acknowledged in its 2017 IRP that adding Tacoma LNG to its portfolio would create a peak capacity ***surplus*** for roughly four years after the project's anticipated in-service date.[3] Third, much of the deficit PSE anticipates beginning in 2022/2023 would be the direct result of transferring 10,000 Dth/day of its gas to TOTE's marine fueling needs. In other words, the anticipated deficit is self-inflicted. The company cannot claim it needs the project due to the deficit that would be created if the project went forward. This is circular logic.

Lastly, the primary justification of PSE's need forecast in the 2017 IRP was the anticipated construction of the Kalama methanol project and Woodfibre LNG in British Columbia. Woodfibre LNG has been delayed well past its anticipated timeline and lacks sufficient buyers. Kalama methanol has not been approved and is in fact still undergoing review. Without Kalama methanol, PSE's demand calculations show sufficient resources through 2032. Since PSE indicated to PSCAA that it would no longer even use Tacoma LNG for peaking after 10 years (2028),[4] there is no demonstrated demand when considering the most current IRP.

The second need justification states, "the Proposed Action would enable TOTE to meet new fuel standards for maritime vessels in response to the North American Emissions Control Area (ECA) […]." If TOTE is already meeting these standards through current pollution reduction mechanisms, the second justification of need is also moot.

2. ES.4 Major Conclusions

The major conclusions of the report are flawed. They read, in relevant part,

> *"The use of LNG produced by the Proposed Action, instead of petroleum-based fuels for marine vessels, trucks, and peak shaving is predicted to result in an overall decrease in GHG emissions in the Puget Sound region, a net beneficial impact compared to the No Action Alternative. […] The conclusion regarding the overall reductions in GHG emissions stated above is dependent upon the assumption that the sole source of natural gas supply to the facility is from British Columbia. The analysis supports the recommendation that the facility's air permit include the condition regarding the sole source of the natural gas from British Columbia as a requirement so the analysis and this conclusion is consistent with the proponent's project description."*

This is a conditional conclusion. The first element, that there will be an overall GHG reduction, is dependent on the second, that all gas used by the facility must be sourced in British Columbia. Yet it is impossible to enforce the condition that British Columbia be the sole source of gas supply to the facility, rendering the conclusion moot.

1098-6 13. LCA Inputs and Assumptions - Natural Gas Source
1098-7 13. LCA Inputs and Assumptions - Natural Gas Source
1098-8 4. Language
1098-9 7. SEPA Alternatives

a. PSCAA cannot enforce a requirement that all gas is sourced from BC. PSCAA may make such a recommendation, but it would be nonbinding. A nonbinding recommendation would allow gas to come from any or all supply sources, just as it does today. Utilities, including PSE, purchase gas supplies from the cheapest and most readily available sources. Since the gas can come from other supply sources, the conditional portion of the conclusion is not met. BC would not be the sole source of gas supply to the facility.
b. Even if PSE did *purchase* all of its gas supply from BC, it would not *solely receive* BC gas. Once pipeline gas is injected into an interstate pipeline, it commingles with gas from other sources. PSE's gas supply to the Tacoma LNG facility would include commingled gas from the Westcoast Pipeline and Northwest Pipeline. Westcoast Pipeline transports gas produced in the Western Canadian Sedimentary Basin, a vast basin that is not solely located in BC. Northwest Pipeline is a bidirectional transmission system whose supply areas include the Rocky Mountain states and the San Juan basin.[5] Because the facility does not have a sole-source direct pipeline from the point of extraction, it is also impossible from a pipeline perspective that the sole source of gas supply to the facility comes from British Columbia.

Because the first conclusion in the report (an overall GHG reduction) is conditioned on the second conclusion, and the second conclusion is actually an unenforceable recommendation, PSCAA should not have concluded that that there will be an overall GHG reduction.

Purpose, Need, and Alternatives Considered

1. **1.1 Purpose and Need (p. 1-1)** - The document uses biased and misleading language throughout this section, referring to LNG as a "cleaner fuel" four times without having established that LNG for marine uses is a cleaner fuel source from a GHG perspective, which is the entire scope of this document. Since the SEIS establishes that Tacoma LNG would be a dirty project from a GHG perspective in all but an unenforceable scenario, this section should omit language that the document does not support.
2. **1.2 Alternatives Considered (p. 1-1)** - While the SEIS does not have to analyze alternatives not considered in the FEIS, there does not appear to be a statutory prohibition to doing so. There are a number of pollution reduction alternatives that the SEIS could have analyzed aside from the no-action alternative. Strictly using the no-action alternative is not reasonable given that the document already established that marine vessels in the North American Emissions Control Area (ECA) will have to comply with stringent emissions standards within 200 miles of the United States and Canadian Coasts. (*ES p. 2*) The no-action alternative is not even an option – the very existence of the new standards requires action, so "no action" was not a reasonable scenario to which Tacoma LNG should have been compared in either the FEIS or the DSEIS.
3. **1.2.1 Proposed Action** (p. 1-1) – This section (and others) states that Tacoma LNG would replace the use of marine diesel oil and diesel fuel. It is not true that it would entirely replace those

1098-9 cont'd 18. LCA Inputs and Assumptions - Marine Diesel Oil
1098-10 13. LCA Inputs and Assumptions - Natural Gas Source
1098-11 20. LCA Inputs and Assumptions - Facility Downtime
1098-12 19. LCA Inputs and Assumptions - End Use
1098-13 18. LCA Inputs and Assumptions - Marine Diesel Oil

fuels. Some of the vessels fueled at the facility would use dual-fuel propulsion systems. Second, no one, including PSE, has any idea what other vessel types would visit the facility besides TOTE, so the DSEIS should not assume that LNG would replace MDO and diesel fuel in vessels whose propulsion systems are unidentified. In fact, this assumption is contradicted by the DSEIS itself, which states that some vessels and trucks would simply move LNG from Tacoma LNG to other regional markets. (p. 2) There is no evidence that these "regional supply" vessels would run on LNG at all, so the DSEIS errs in assuming all vessel and truck traffic calling at the project site would be LNG-powered.

Description of Proposed Action

1. Thank you for analyzing both minimum and maximum production rates at the proposed facility. Other permit documents and pollution analyses used a production rate of 250,000 gallons per day (gpd), the minimum production rate, while ignoring that the facility can produce up to 500,000 gpd. This has resulted in gross underrepresentation of the facility's pollution impacts throughout the permitting process. Further details throughout section 2.3 should have been acquired by the lead agency.
2. **2.2.1 Natural Gas Extraction and Transportation and 2.3 LNG Processing Facility** – States that the gas supply to the facility would come exclusively from British Columbia. As noted above, this is neither a reasonable understanding of interstate pipeline transportation nor an enforceable condition. For the sake of brevity, I raise the same objection to every repetition of this assertion in the DSEIS.
3. **2.3.2 Liquefaction (p. 2-3) -** States that the facility would liquefy LNG for about 51 weeks of the year, while LNG would be vaporized for up to 10 days of the year. This is a very packed schedule that does not recognize any of the downtime that will be necessary at the facility. Scheduled maintenance usually occurs a few times per year at an LNG facility, and since Tacoma LNG will not be operating on fairy dust and magic, we must assume that the facility will need to perform regular maintenance like all other LNG plants. Other possible short-duration downtimes include unplanned repairs or maintenance, and emergency situations. Downtime flares produce larger flames and black smoke, as well as emissions including carbon dioxide, carbon monoxide, nitrogen oxides, particulate matter and trace quantities of hydrocarbons. Emissions produced during standard downtimes should be included, and the number of operation days in this section should be amended for accuracy.
4. **2.3.5 Delivery to TOTE and Other Vessels** – The DSEIS notes where nitrogen for purging will be captured and routed to the ground flare. But for bunkering vessels that would conduct ship-to-ship bunkering, there is no indication that nitrogen or hydrocarbons would be captured rather than vented into the atmosphere. Since these bunkering vessels could consume 69.15% of the end use share of LNG in Scenario B and 46.3% in Scenario A, questions about nitrogen and other hydrocarbon releases from ship-to-ship bunkering should be addressed.

1098-14 13. LCA Inputs and Assumptions - Natural Gas Source
1098-15 10. LCA Calculations
1098-16 13. LCA Inputs and Assumptions - Natural Gas Source

The rationale for not evaluating the majority of bunkering emissions appears to be the statement that "the current situation (i.e., the No Action Alternative) involves bunker barge operations using fuel oil." Bunkering with marine fuel oil and bunkering with LNG are vastly different operations – only LNG bunkering requires constant purging of GHG emissions from hoses and other connections. LNG bunkering also somewhat regularly causes GHG emissions releases due to the difference in density between the LNG already in the fuel tank and density of the new LNG fuel. Since the primary purpose of the facility is LNG bunkering, PSCAA has erred in declining to assess any emissions that will be produced by the majority of bunkering activities. Basing this decision on the no-action alternative would be justified if the no-action alternative already captured gaseous emissions from purging LNG bunkering hoses. It does not.

BC Gas Supply and Life Cycle Analysis (LCA) Problems

The following comments pertain to issues that can be found throughout the DSEIS, including Appendices B and C, due to underlying issues with the life cycle analysis.

1. The DSEIS's analysis relies on flawed assumptions about BC's methane emissions. There is no evidence that BC's fugitive emissions rate is substantially lower than that of the US. This assertion comes from non-representative bottom-up studies whose flaws have been extensively critiqued and contradicted by scientists including the following:
    a. A peer-reviewed study published in Atmospheric Chemistry and Physics, "Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada" (2017) found that BC's emissions are at least 2.5 times higher than what the province estimates.
    b. More than 130 scientists and climate policy experts penned a May 2016 letter to the Minister of Environment and Climate Change saying a leakage rate assumption similar to that used in the GHGenius model *(Table B.3)* "has not been verified by field studies."
2. Upstream emissions factors from the GREET and GHGenius models were used to calculate life cycle emissions. These models allow users to input data specific to their project into the model so they may calculate project-specific emissions. The LCA errs where it uses placeholder data rather than project-specific data.
3. The LCA uses a global warming potential of methane from the AR4 (IPCC 2007) instead of the AR5 (IPCC 2014). The DSEIS should use the most current scientific consensus in its analysis, which is represented in the AR5.
4. The document repeatedly refers to "comprehensive" BC regulations that reduce methane without actually citing said regulations so that claims that they greatly reduce methane emissions can be verified. (*See section 2.2 of the DSEIS and Appendix C section 2.4.1, which refers to but does not clearly identify "comprehensive drilling and production regulations".*) Section 2.4.1 of Appendix C (p. 41) says that flaring is prohibited in British Columbia. To my knowledge, there are no laws preventing flaring in BC. In fact, the Oil and Gas Activities Act

1098-17 12. LCA Inputs and Assumptions - Global Warming Potential Value

explicitly permits flaring. *(See for example Part 7, Sections 42, 43, 44 of the Act)* This calls into question the accuracy of other references to BC's methane emissions laws.

Thank you for this opportunity to submit comments on the DSEIS for Tacoma LNG. It is my hope that the final document will be revised to address the above errors, and that PSCAA will rewrite its conclusion to reflect what's clear from a critical analysis of the DSEIS: Tacoma LNG would not reduce emissions in the Puget Sound region except in a blue-sky scenario that has no basis in fact or enforceability.

Thank you very kindly,

Tarika M. Powell, Researcher

Sightline Institute

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[1] Puget Sound Energy, *PSE 2017 IRP, Chapter 7: Gas Analysis*, p. 7-4.
[2] 2017 PSE Integrated Resource Plan, Executive Summary, p. *1-11*
[3] Puget Sound Energy, *PSE 2017 IRP, Chapter 7: Gas Analysis*, p. 7-5. *See figure 7-2.*
[4] Appendix C, p. 24 states that peak shaving for power production is expected to occur for 10 years and afterward Tacoma LNG will presumably sell LNG for additional marine fuel applications.
[5] Williams Company, Northwest Pipeline, https://co.williams.com/operations/west-operations/northwest-pipeline/

From: Nesslein, Katarina J.
To: Public Comment
Cc: Wood, Thomas; steve.secrist@pse.com; david.mills@pse.com
Subject: Puget Sound Energy Comment Letter on DSEIS (w/attachments) [S-R.0063442.00014]
Date: Wednesday, November 21, 2018 2:26:46 PM
Attachments: DSEIS LCA calculations Scen A_modified.xlsx
2018-11-21 PSE Comment Ltr on DSEIS.pdf
DSEIS LCA calculations Scen B_modified.xlsx

Good Afternoon,

On behalf of Puget Sound Energy, attached please find a find a letter of today's date providing comments on the Draft Supplemental Environmental Impact Statement prepared by the Puget Sound Clean Air Agency.

Should you have any questions, please do not hesitate to contact us.

Thank you.

Sincerely,

Katarina J. Nesslein | Practice Assistant to Joan Snyder, Thomas Wood, Geoffrey Tichenor and Guy Thompson
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PUGET SOUND ENERGY
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November 21, 2018

BY HAND DELIVERY AND EMAIL

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, Tacoma LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101
publiccomment@pscleanair.org

Re: Comments on Tacoma LNG Project Draft Supplemental Environmental Impact Statement

Dear Agency:

Puget Sound Energy, Inc. ("PSE") appreciates this opportunity to comment on the Draft Supplemental Environmental Impact Statement ("DSEIS") prepared by the Puget Sound Clean Air Agency ("PSCAA") and currently in the public notice process.

As the Northwest's largest utility, PSE has been a leader in developing and promoting clean energy and advancing efficiency programs and technologies. In the last decade, PSE has deployed over 770 megawatts of wind generation and other green energy projects and is currently the nation's third-largest utility producer of wind power.

In addition to developing renewables, we have gone above and beyond in our conservation efforts establishing award-winning programs in Energy Conservation and Green Power. PSE has one of our country's best and most comprehensive energy-efficiency programs for helping homes and businesses reduce their energy use. PSE offers our customers financial incentives and technical help to conserve energy, and PSE also promotes the growth of renewable electricity production in its service area through various customer programs. We are keenly aware of our customers' interest in reducing carbon emissions, and we share their concern and commitment to achieving meaningful carbon reduction. At the end of 2017, we announced our TOGETHER commitment to reduce carbon emissions 50 percent by 2040 and have developed a measurable plan with short- and long-term steps to reach this goal while continuing to meet our customers' needs.

If we are going to significantly reduce carbon emissions in our state, however, we have to address transportation. In Washington, nearly half of all carbon emissions come from

transportation. PSE has been supporting the market growth of electric vehicles and is working to further expand our efforts through our alternative vehicle strategies and supporting charging stations the region needs to make electric vehicles a central part of our transportation future. At the same time, we have to think of the whole picture and consider commercial and industrial transportation uses.

We have the opportunity to significantly reduce emissions with cleaner alternatives to diesel and other fuels. PSE's partnership with TOTE Maritime will make just this kind of impact. When TOTE's first ship leaves Tacoma for Alaska fueled with LNG, it will result in material reductions of harmful air pollutants, including diesel particulate, sulfur dioxide, oxides of nitrogen and greenhouse gases. In concert with the vessel owners, the Tacoma LNG facility will create the greenest shipping fleet on the West Coast. In short, Tacoma LNG is a critical component of moving to lower carbon and cleaner energy infrastructure.

PSCAA's DSEIS is an integral step in moving this effort forward. As with any draft document, there are inevitably items that merit correction, which is why SEPA provides for public input and comment in the first instance. While the DSEIS text itself is succinct, the life-cycle analysis is broad in reach and quite dense. PSE has given the DSEIS and its referenced materials meticulous review, and we largely concur with its methodology, analysis and conclusions. Consequently, our comments are minor and carefully focused on accuracy and detail, so that the Final Supplemental Environmental Impact Statement ("FSEIS") sets the bar high for other greenhouse gas ("GHG") impacts analyses in the future across Washington. With these thoughts in mind, PSE respectfully submits the following comments to PSCAA for consideration in finalizing the Tacoma LNG DSEIS. We think that you have a quality product based on a reputable consultant that reaches the correct conclusion that the proposed project will result in a net reduction in GHG emissions. Nevertheless, there are specific improvements suggested below that, without changing the conclusion, will enhance the internal consistency and accuracy of the final product. These comments are not necessarily presented in order of importance.

Comment #1: PSE supports the inclusion of a condition in the Tacoma LNG air permit that requires that natural gas come exclusively from British Columbia.

Several commenters have wrongly criticized PSCAA for assuming that the natural gas to be used by the Tacoma LNG facility will come from British Columbia. This criticism is misplaced. PSE has identified from the outset of the PSCAA review process that the natural gas to be used by the Tacoma LNG facility will come from British Columbia. All gas delivered to PSE's gas system flows under firm pipeline capacity contracts on Williams' Northwest Pipeline, LLC ("NWP"). NWP is the only pipeline system for gas to get to PSE's system. NWP is fully contracted and has been since their last expansion in 2003. Each firm pipeline contract has a firm receipt point

and a firm delivery point(s). Firm receipts from Sumas can only originate in British Columbia. The firm receipt point on contracts acquired to serve the Tacoma LNG facility is Sumas.

PSE has consistently stated that the gas delivered to Tacoma LNG for liquefaction, storage and subsequent use will originate in British Columbia. For that reason, PSE supports a condition in the air permit to memorialize this commitment and put to rest the factually inaccurate suggestion that natural gas from other regions will be used by the facility.

Comment #2: PSE supports the methodology employed by PSCAA to quantify upstream greenhouse gas emissions associated with extraction and transportation of natural gas.

Several commenters have wrongly criticized PSCAA for relying upon a British Columbia-specific analysis using the GHGenius model. We believe that the estimate of greenhouse gas emissions generated by GHGenius for British Columbia natural gas production is conservative and overstates the upstream greenhouse gas emissions. More accurate information can be obtained from the Canadian National Inventory Report ("NIR") in conjunction with provincial data on how the NIR value (which covers the oil and gas sector broadly) was developed. Both the GHGenius values and the NIR values are widely used and accepted. Although a small number of articles suggest that these values underreport fugitive emissions, general consensus has not been reached on this point and the values in the articles suggesting that underreporting has occurred are speculative. As explained further below, PSCAA must rely on the most recent widely accepted data and not arbitrarily base estimates on isolated studies.

The SEIS should be based on the Provincial data

On May 25, 2018, PSE submitted a Background Information Document ("BID") that assessed the life-cycle greenhouse gas emissions associated with the proposed facility. As part of that analysis, PSE determined emissions for natural gas production in British Columbia based on Province-specific data from the Canadian NIR and British Columbia natural gas production data as reported by the Province in its Natural Gas & Oil Statistics data series. PSE believes that this is the most accurate means of determining greenhouse gas emissions associated with natural gas production in British Columbia. PSE recognizes that there is not a substantial difference between using the Province-specific fugitive emission rate (estimated at 0.2%) and the GHGenius fugitive emission rate (estimated at 0.32%). However, the SEIS should represent the most accurate information available. For that reason, we recommend that PSCAA revise its analysis to use the current British Columbia-specific data presented in the BID rather than relying on the data generated by GHGenius.

The SEIS cannot inflate fugitive emissions based on incomplete studies

Comments that PSCAA should artificially inflate the upstream fugitive emission rates based on limited and problematic mobile studies should be rejected. The primary article that forms the basis for these comments (the Atherton study) was published in October 2017.[1] The Atherton study provided valuable information about the need for increased measures to identify and reduce fugitive methane emissions from specific emission points. As the authors conclude, "Our study highlights the need for emission reduction efforts in the Montney to be focused on the few higher-emitting active gas wells, as well as abandoned, and aging infrastructure."[2] PSE supports this conclusion and notes that, unlike many areas in the U.S., the Canadian and British Columbia governments have implemented extensive measures in the years following the time period when the data underlying the Atherton study were collected (8/14/2015-9/5/2015). For example, in 2016, British Columbia implemented new guidelines eliminating routine flaring.[3] On April 26, 2018, the Canadian national government adopted new regulations that require companies to control methane leaks from equipment and the release of methane from compressors starting on January 1, 2020.[4] The Atherton paper concluded that "compressor stations emitted most frequently" and so the 2018 regulations appropriately target a source that Atherton expressly called out.[5] The 2018 Canadian regulations also limit methane leaks associated with well completion with the requirements taking effect on January 1, 2020.[6] These Canadian regulations also impose limits on methane venting and the release of methane from pneumatic devices starting January 1, 2023.[7] In short, the Atherton study was an important data point about the state of methane fugitive emissions in 2015 and the need for more regulation. Consistent therewith, the Canadian and British Columbia governments have acted since that study was performed, implementing a broad swath of regulations targeting fugitive methane emissions from the oil and gas sector.

It is also important to note that there were significant limitations relating to the Atherton study that call its quantitative conclusions into question. PSE recognizes the value of the Atherton study for qualitatively focusing the provincial and national governments on the need for further regulation of fugitive methane sources. As explained above, however, that has already been

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[1] Atherton et al.; *Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia*, Canada, Atmos. Chem. Phys., 17, 12405-12420, 2017.
[2] *Id.*
[3] https://www.bcogc.ca/node/5916/download.
[4] https://www.canada.ca/en/environment-climate-change/news/2018/04/federal-methane-regulations-for-the-upstream-oil-and-gas-sector.html.
[5] Atherton et al; *Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia*, Canada, Atmos. Chem. Phys., 17, 12405-12420, 2017.
[6] https://www.canada.ca/en/environment-climate-change/news/2018/04/federal-methane-regulations-for-the-upstream-oil-and-gas-sector.html.
[7] *Id.*

accomplished. Nonetheless, there are serious questions regarding the representativeness of the quantitative estimates of methane emissions expressed in the Atherton paper and the limitations of using the study for quantifying methane emission rates. As discussed in the recent paper published by the National Academy of Sciences ("NAS"), methane emissions from gas wells peak during mid-afternoon hours.[8] As described by the NAS authors, "maintenance activities, such as manual liquid unloadings (MLUs) or depressurization of equipment ("blowdowns"), are often triggered by human operators during daytime work-week hours and may produce high emission rates for short durations."[9] As discussed in the 2018 NAS paper, daytime weekday measurements, such as the Atherton study relied upon, should not be used to estimate a methane emission rate as they typically will reflect the absolute peak of emitting activity and can greatly distort the overall inventory.[10] While Atherton's qualitative recommendation that the government focus on "the few higher-emitting active gas wells, as well as abandoned, and aging infrastructure" may have merit, the quantitative component of the paper is highly suspect.

In summary, studies such as the Atherton report help focus regulatory priorities, but cannot be used, nor are intended, to adjust accepted inventory values for methane emission rates. As the Atherton authors themselves stated in response to peer review comments, "The primary purpose of the paper was to determine emission frequencies, not to create a highly accurate volumetric inventory."[11] At this point in time, the most accurate estimate of the emission rate for natural gas production in British Columbia is the Province-specific data from the Canadian NIR and British Columbia natural gas production data previously provided to PSCAA by PSE.

Comment #3: The DSEIS has inconsistencies regarding the TOTE fuel oil terminology.

The DSEIS is internally inconsistent in describing the type of fuel that TOTE currently uses and would continue to use under the No Action Alternative. We suggest that the DSEIS be revised to use a consistent acronym to describe the fuel to be used by TOTE and other ships under the No Action Alternative, and accordingly the emission factors used in the spreadsheets need to reflect the correct fuel.

The DSEIS describes the Proposed Action as a terminal to supply LNG to vessels "replacing the use of marine diesel oil ("MDO") and diesel fuel."[12] Table 3-1 of the DSEIS states that under the No Action Alternative, MDO would continue to be used by TOTE and other potential future customers of the Tacoma LNG facility. This is further discussed in Section 3.3.3 of the DSEIS:

[8] Vaughn et al.; *Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region*, Proceedings of the National Academy of Sciences (Nov. 2018) 115 (46) 11712-11717; DOI: 10.1073/pnas.1805687115; http://www.pnas.org/content/115/46/11712.
[9] *Id.*
[10] *Id.*
[11] https://www.atmos-chem-phys-discuss.net/acp-2017-109/acp-2017-109-AR1.pdf
[12] DSEIS Section 1.2.1.

1328-1 cont'd 18. LCA Inputs and Assumptions - Marine Diesel Oil
1328-2 18. LCA Inputs and Assumptions - Marine Diesel Oil

> Under the No Action Alternative, marine engines would continue to operate on MDO. Under the 250,000 gpd scenario, the Proposed Action would displace 21.48 million gallons of MDO used by TOTE marine vessels, and would provide additional capacity to replace another 23.21 million gallons of MDO used by other marine vessels. Under the 500,000 gpd scenario, the expanded capacity would also displace 21.48 million gallons of MDO used by TOTE marine vessels, and would provide additional capacity to replace up to 69.32 million gallons of MDO used by other marine vessels.

As seen in the quote above, the DSEIS repeatedly states that under the No Action Alternative, TOTE will utilize MDO. However, in Appendix C to the DSEIS, LCA states that the fuel used by TOTE is Marine Gas Oil ("MGO"). We recognize that MGO and MDO are very similar distillate fuels that are both referred to in common maritime use as diesel. However, in order to avoid confusion the SEIS needs to consistently describe the fuel used by TOTE. In its May 3, 2018 response to PSCAA's information request, TOTE stated that if the LNG terminal is not constructed, "[t]he current engines would remain and utilize 0.1% Sulphur compliant marine fuel (MGO)."[13] Therefore, we recommend that the DSEIS text be revised to be consistent with the LCA report in Appendix C and identify the fuel that TOTE employs as MGO.

Comment #4: The DSEIS spreadsheets should use marine diesel factors instead of bunker fuel factors to calculate the upstream emissions associated with TOTE's fuel oil.

Comment #3 is about the use of a consistent term to describe the fuel that TOTE uses and would continue to use under the No Action Alternative. Separate from that issue, but related to TOTE's current fuel use, there are calculation issues with the spreadsheets because they are based on the assumption that TOTE burns bunker fuel when in actuality it burns distillate fuel (diesel). The DSEIS calculations rely in many places on assumptions that vary based on the type of fuel employed. Several emission calculation errors derive from the incorrect assumption that the fuel TOTE will utilize under the No Action Alternative is appropriately modeled as residual oil or "bunker fuel for marine vessels" in GREET. As explained above, the appropriate fuel under the No Action Alternative for TOTE vessels is MGO. The MGO fuel that TOTE currently uses and would use under the No Action Alternative is most closely approximated as low sulfur diesel fuel within the GREET model, not bunker fuel. Assuming that TOTE will employ bunker fuel leads to an over-estimation of emissions under both the Action and No Action Alternatives.

[13] Response to Question 8, *Tacoma LNG SEIS Data and Information Request for TOTE Maritime* (May 3, 2018).

This confusion between MGO and bunker fuel does not change the DSEIS conclusions. In fact, the net impact of this misunderstanding, which includes both upstream and downstream inaccuracies, is that the DSEIS underestimates the total GHG benefit associated with the Action Alternative. Nevertheless, the factors should be corrected so the numbers provided in the analysis are accurate. In this Comment #4 and the following Comment #5 we describe specific corrections needed for the upstream and downstream emissions. These comments are made in reference to the Scenario A spreadsheet (250,000 gpd), but apply equally to the Scenario B spreadsheet (500,000 gpd).

The DSEIS spreadsheets contain an error relating to the calculation of the upstream GHG emissions associated with producing TOTE's fuel oil because they use the GREET bunker fuel emission factor instead of the GREET diesel fuel emission factor. This leads to the under-estimation of upstream emissions associated with TOTE's fuel under the No Action Alternative.

The upstream emissions related to TOTE marine diesel production (tonnes/year CO2e) are identified in cell H140 of the "Upstream" sheet. The individual constituent GHGs (CO2, CH4 and N2O) are calculated in cells E140:G140. Each of those three is calculated similarly; the formula for CO2 is as follows:

=$C140*C$87/1000

Where:
C140 = GBtu/year of diesel fuel consumed
C87 = CO2 emission rate for bunker fuel

As you can see from the defined terms, there is an error in the emission rate being used. The purpose of the calculation is to determine the CO2 emissions associated with producing and delivering marine diesel (MGO) and yet the emission rate used is for the less refined bunker fuel. Because the upstream emissions associated with refining an MMBtu of bunker are roughly half the emissions associated with refining an MMBtu of diesel, this error results in the upstream emissions associated with TOTE marine diesel being understated. Table 1 shows how the upstream TOTE marine diesel emissions increase by approximately 12,500 tonnes per year when the appropriate emissions rate is utilized.

Table 1. No Action Alternative: Upstream TOTE Marine Diesel Emissions

	GHG Emissions tonne/year (as proposed)	**GHG Emissions tonne/year** (corrected)
Upstream TOTE Marine Diesel (MGO) Emissions	52,448	64,775

Comment #5: The DSEIS spreadsheets should use diesel fuel factors as opposed to bunker fuel factors to calculate the downstream emissions.

As introduced in Comment #4, the confusion over distillate fuel versus bunker fuel also resulted in errors in the downstream emissions calculations for both LNG and oil-fired vessels. These errors all derive from the incorrect assumption that the fuel TOTE will utilize under the No Action Alternative is appropriately modeled as residual oil or "bunker fuel for marine vessels" in GREET. As explained above, the distillate fuel TOTE vessels use today and will continue to use under the No Action Alternative is most closely approximated as low sulfur diesel fuel within the GREET model. Assuming that TOTE employs bunker fuel leads to over-estimated emissions under both the Action and No Action Alternatives. An example of how this impacts the spreadsheets is presented below.

In response to an information request from PSCAA, PSE provided data on the grams per trip of CO2 and the estimated tonnes of fuel that would be consumed during each trip. The estimated fuel use is calculated from the modeled engine work required over the course of a trip using fuel consumption factors listed in cells C110:C112 of the "EF Marine Vessels spec. TOTE" sheet. These fuel consumption factors are themselves calculated from direct CO2 emission factors for the Main Engine, Auxiliary Engine and Boiler. The formula used for calculating the fuel consumption factor for the Main Engine (cell C110) was:

=Q13*(12/44)/Fuel_Specs!$F$18

Where:

Q13 = the gCO2/kWh for a medium speed diesel.
Fuel_Specs!$F$18 = Carbon percentage by weight for 2.8% sulfur bunker fuel

This generated a fuel consumption factor with reported units of gallons MDO/kWh.

However, the 2.8% sulfur bunker fuel used in the SEIS calculation shown above is both (a) illegal to be used in a TOTE (or equivalent) vessel and (b) not equivalent in carbon content to the correct MGO baseline fuel for TOTE. Thus, the carbon percentage by weight for 2.8% bunker fuel should not be used to generate a 0.1% sulfur MGO fuel consumption factor. This matters because the carbon percentage by weight is lower for low sulfur diesel than that for high sulfur bunker fuel. By using the wrong denominator value, the fuel consumption factor is slightly off. When the proper fuel consumption factor is applied, the amount of distillate fuel consumed per trip changes by 1.5 tonnes per trip for the Main Engine as shown in Table 2 below.

Table 2. Fuel Consumption Estimates

	Fuel Consumption Estimate in Spreadsheet Using Wrong Fuel Consumption Factor	Fuel Consumption Estimate Using Accurate Fuel Consumption Factor
	(MT MGO)	(MT MGO)
Fuel Consumed Within 200 nm	62.0	62.2
Fuel Consumed Outside 200 nm	386.5	387.9
Total Fuel Consumed	448.6	450.1

This technical error is then carried into the calculation of the g/tonne MGO emission rate used to calculate the ultimate g/MMBtu MGO, LHV emission rate that is the foundation of the calculations. For example, the emissions rate (g/tonne MGO) for CO2 is calculated in cell L48 of the "End use TOTE-Fuel Oil Vessel" sheet using the following formula:

=L47*1000000/SUM($D$59:$F$59)

Where:

L47 = total emissions
$D$59:$F$59 = fuel consumption as determined using the fuel consumption factors

With the fuel consumption factors corrected, the emission rates (g/tonne MGO) shown in cells L49:P49 in the "End use TOTE-Fuel Oil Vessel" sheet change as shown in Table 3 below.

Table 3. Emission Rates Under No Action Alternative (g/tonne MGO)

	Emission Rate Estimate in Spreadsheet Using Wrong Fuel Consumption Factor	Emission Rate Estimate Using Accurate Fuel Consumption Factor
	(g/tonne MGO)	(g/tonne MGO)
CO2	3,182,667	3,171,667
NO2	143	152
CH4	49	49
CO2c	3,198,951	3,187,895
CO2e	3,242,897	3,234,406

As you can see, this technical error results in the DSEIS overstating the GHG emission rates (g/tonne MGOe) associated with the No Action Alternative.

Similarly, with the fuel consumption factors corrected, the emission rates (g/tonne MGO) shown in cells L49:P49 in the "End use TOTE-LNG Vessel" change as shown in Table 4 below.

Table 4. Emission Rates Under Action Alternative (g/tonne MGO)

	Emission Rate Estimate in Spreadsheet Using Wrong Fuel Consumption Factor	Emission Rate Estimate Using Accurate Fuel Consumption Factor
	(g/tonne MGOe)	(g/tonne MGOe)
CO2	2,180,117	2,172,582
NO2	153	152
CH4	25,931	25,841
CO2c	2,194,855	2,187,269
CO2e	2,888,582	2,878,599

As you can see, this results in the DSEIS overstating the GHG emission rates (g/tonne MGOe) associated with the Action Alternative.

This technical error is further magnified when the emission rates are divided by the fuel-specific heating value in the "Fuel_Specs" sheet to convert the g/tonne MGO emission rate to a g/MMBtu basis. In cell L49 of the "End use TOTE-Fuel Oil Vessel" sheet, a g/MMBtu MGO emission rate is calculated using the following formula:

=L48/(lbperkg*Fuel_Specs!$P$18)*1000

Where:

L48 = the emission rate in g/tonne MGO
Fuel_Specs!$P$18 = the heating value for 2.8% sulfur bunker fuel

As you can see, cell L49 incorrectly imports the heating value for 2.8% sulfur bunker fuel (i.e., "Fuel_Specs" sheet cell P18) rather than the heating value for a fuel equivalent to MGO such as low sulfur diesel (e.g., "Fuel_Specs" sheet cell P14). Fuel with a 2.8% sulfur level is prohibited from use within an Emission Control Area ("ECA") and is prohibited from use anywhere after January 1, 2020 unless the vessel is operating scrubbers. Therefore, there is no basis for using the bunker fuel heating value. As a result of using the bunker fuel heating value rather than the diesel fuel heating value, the g/MMBtu emission rate calculation is incorrect. In order to calculate an accurate g/MMBtu emission factor, the denominator in cell L49 must be the heating value associated with a low-sulfur diesel (cell C14 in the "Fuel_Specs" sheet). The use of a heating value associated with an obviously wrong fuel type is clearly inappropriate. This same technical error affects both the Action Alternative ("End Use TOTE-LNG Vessel" sheet) and the No Action Alternative ("End Use TOTE-Fuel Oil Vessel" sheet). Comparisons of the erroneous

emission rates and the accurate emission rates for each scenario are shown in Table 5 and Table 6 below.

Table 5. Emission Rates Under No Action Alternative (g/MMBtu MGO, LHV)

	Emission Rate Estimate in Spreadsheet Using Wrong Heating Value	Emission Rate Estimate Using Accurate Heating Value
	(g/MMBtu MGO, LHV)	(g/MMBtu MGO, LHV)
CO2	85,081	78,179
NO2	4	4
CH4	1	1
CO2c	85,517	78,579
CO2e	86,691	79,725

Table 6. Emission Rates Under Action Alternative (g/MMBtu MGO, LHV)

	Emission Rate Estimate in PSCAA Spreadsheet Using Wrong Heating Value	Emission Rate Estimate Using Accurate Heating Value
	(g/MMBtu MGO, LHV)	(g/MMBtu MGO, LHV)
CO2	58,280	53,552
NO2	4	4
CH4	693	637
CO2c	58,674	53,914
CO2e	77,220	70,995

Ultimately, the values in the two tables above are used to calculate the marine vessel emissions associated with the Action and No Action Alternatives. For example, in cell F59 of the "Direct End use" sheet, methane emissions from LNG combustion are calculated using the following formula:

=$F31*Factors!E$73/1000

Where:

F31 = the annual LNG consumption in GBtu/yr, LHV
Factors!E$73 = the methane emission rate in the table above (693 g/MMBtu LHV, uncorrected; 637 g/MMBtu LHV, corrected)

Because the emissions are calculated by multiplying the LNG consumption by a flawed emission rate, the ultimate result is inaccurate.

Correcting the errors is relatively straightforward and does not result in a material change in the overall conclusions expressed in the DSEIS. Once the emission rates are corrected, the GHG emissions attributable to the upstream and downstream marine use of LNG fuel and MGO decline. As shown in cell H59 of the "Direct End use" sheet, direct end use emissions from LNG drop from 529,859 tonnes/year CO2e to 490,443 tonnes/year CO2e. The GHG emissions attributable to the downstream marine use of MGO (i.e., the No Action Alternative) decrease from 609,291 tonnes/year CO2e to 558,611 tonnes/year CO2e. Tables 7 and 8 below summarize the changes under Scenario A (250,000 gpd) that result from the corrections outlined above.

Table 7. Action Alternative: End Use Emissions

	GHG Emissions tonne/year (as proposed)	**GHG Emissions tonne/year** (corrected)
End Use LNG	**529,859**	**490,443**
On-site Peak Shaving	43,854	43,854
TOTE Marine	225,993	207,659
TOTE Marine Diesel Pilot fuel	7611	7,000
Other Marine LNG (by Bunker Barge)	244,185	224,375
Other Marine Diesel Pilot Fuel	8,216	7,555

Table 8. No Action Alternative: End Use Emissions

	GHG Emissions tonne/year (as proposed)	**GHG Emissions tonne/year** (corrected)
Total End Use Diesel /Fuel Oil/LNG	**602,291**	**558,611**
Diesel Peak Shaving for Power	58,891	58,891
TOTE Marine Diesel	261,325	240,326
Other Marine Diesel (by Bunker Barge)	282,076	259,394

When these corrections are combined with the corrections to the upstream marine diesel emissions rates, total emissions under the No Action Alternative ("Results" sheet, cell E51) decline from 727,536 tonnes/year CO2e to 696,183 tonnes/year. Total emissions under the Action Alternative ("Results" sheet, cell E31) decline from 687,639 tonnes/year to 648,223

tonnes/year. The decline in emissions under the Action Alternative is slightly greater than the decline under the No Action Alternative, thereby modestly improving the GHG reductions for the Action Alternative.

The DSEIS and associated spreadsheets should be revised to correct the errors identified above. Although these corrections do not change the ultimate conclusion expressed in the DSEIS that the Action Alternative results in a net decrease in life cycle GHG emissions as compared to the No Action Alternative, the FSEIS should reflect the accurate fuel assumptions and resulting calculations. We have included as an attachment to this letter a set of revised spreadsheets that reflect the suggested changes discussed in comments 4 and 5. You will see that the revised spreadsheets include toggles ("Input" sheet; cells H32 and H33) that allow you to turn on and off the corrections so as to be able to see the impact of using the correct factors/values.

Comment #6: The DSEIS greenhouse gas calculations should be revised to reflect the greenhouse gas emissions associated with Tacoma LNG's electricity supplier rather than a Washington State average mix.

Section 2.2.3 of the DSEIS accurately describes the specific electric power generation mix serving the facility, but then does not use that mix to calculate the greenhouse gas emissions from the facility's consumption of electricity. Instead the DSEIS imputes to the Tacoma LNG facility GHGs associated with the Washington statewide average for electric generation into the GHG calculations thus overstating emissions. In addition, the text of the DSEIS misstates the greenhouse gas emission rate that is imputed to the facility, by taking into account only the upstream power generation emissions and not the emissions from the generating facility itself. This second error relates only to the text of the DSEIS and not the actual calculations performed in the supporting spreadsheets. Both errors appear to be oversights that should be corrected.

As accurately stated in section 2.2.3 of the DSEIS, the Tacoma LNG facility electricity load will be exclusively served by and sourced from Tacoma Power ("Power would be delivered to the Tacoma LNG facility through the Tacoma Power electrical system."). There is no option for the facility to be served by other suppliers. Section 2.2.3 of the DSEIS also accurately notes that the majority of Tacoma Power's electricity portfolio is generated by hydroelectric, nuclear and non-hydroelectric renewable energy sources. The spreadsheets supporting the PSCAA life cycle analysis identify the combined upstream and power plant emissions associated with the Tacoma Power grid mix as 29.9 g/kWh CO_2e.[14] The same spreadsheets identify the combined upstream and power plant emissions associated with the average Washington grid mix as 215 g/kWh

[14] "Upstream" sheet; sum of cells H29 and H30.

CO_2e.[15] The DSEIS then calculates the greenhouse gas emissions associated with construction and operation of the Tacoma LNG facility using the 215 g/kWh CO_2e emission factor.[16]

The electricity supply for the facility must come from Tacoma PUD, so it is not accurate to use a state-wide grid mix when specific information exists for Tacoma PUD. Tacoma Power generates all the electricity it distributes, including that provided to the facility and has a surplus of power. Tacoma Power has had decreasing load and is forecasting the continuing sale of surplus power to the grid in the future.[17] As a result, there is no basis to assume that the greenhouse gas emissions associated with the generation mix serving Tacoma LNG's load will increase above the current level. Calculating the greenhouse gas emissions associated with Tacoma LNG's electricity consumption based on the Washington average (215 g/kWh CO_2e) as opposed to the emission rate associated with Tacoma Power (29.9 g/kWh CO_2e) is not accurate and should be corrected in the SEIS.

In addition, we believe that the text of the DSEIS needs to be revised to accurately reflect the emission rates used in the spreadsheet calculations for calculating GHGs associated with upstream statewide average electricity generation GHG emissions. Section 2.2.3 of the DSEIS states that "an average emission rate of 18 g/kWh carbon dioxide equivalent (CO_2e), was used to estimate upstream electricity emissions (State Energy Office at the Washington Department of Commerce)." 18 g/kWh CO_2e comes from cell H27 of the "Upstream" sheet in the supporting spreadsheets. We believe that the wrong value was copied out of the "Upstream" sheet and that the sum of cells H27 and H28 (i.e., 215 g/kWh CO_2e) should be referenced for calculations where the Washington average electricity generation GHG emission rate is appropriately employed. As explained above, it is not appropriate to use the Washington average electricity generation GHG emission rate for the Tacoma LNG facility because all of its electricity will be obtained from Tacoma Power. However, to the extent that the Washington average electricity generation GHG emission rate is used for calculations such as upstream refining, the text should accurately reference the emission factors used in the calculations.

In summary, the emission rate associated with Tacoma Power's generation portfolio must be used to calculate greenhouse gases associated with constructing and operating the Tacoma LNG facility. This emission rate must then be reflected in the text of the SEIS. While not changing the conclusion in the DSEIS, accurately characterizing the GHG emissions attributable to the electricity used by the proposed facility will more fully recognize the benefits attributable to the Action Alternative. The spreadsheets placed on public comment as an attachment to the DSEIS include a toggle ("Input" sheet; cell H24) that allows one to correct the generation portfolio to reflect the Tacoma Power generation mix. It may simply have been an oversight that the toggle

[15] "Upstream" sheet; sum of cells H27 and H28.
[16] "Upstream" sheet; cells G42 and G47.
[17] Tacoma Power Integrated Resource Plan, 2017 Update https://www.mytpu.org/file_viewer.aspx?id=64787.

was switched to the state-wide mix given that the text of the DSEIS accurately reflects that electricity for the proposed project would come exclusively from Tacoma Power. This oversight should be corrected in the FSEIS.

Comment #7: The DSEIS should be revised to employ the correct CA_GREET value for liquefaction and storage of LNG and to remove the inaccurate statement that the proposed facility is not energy efficient.

On page 89 of Appendix C of the DSEIS (the LCA report) LCA incorrectly states that "[t]he power consumption of Tacoma LNG is considerably higher than the CA_GREET default value." This misstatement should be corrected because the Tacoma LNG facility is in fact highly energy efficient. The unnumbered table on page 89 of Appendix C states that the electricity consumption for Tacoma LNG is 1,348 kWh/1,000 gal LNG while the CA_GREET value is 43.89 kWh/1,000 gal LNG. Based on these values, LCA reaches the conclusion that the proposed facility is not energy efficient. This conclusion is wrong because LCA uses an incorrect CA_GREET energy consumption value to derive the kWh/1,000 gal LNG power consumption value. LCA employed a Total Energy/Unit LNG value from CA_GREET of 1,607 $Btu_{energy}/MMBtu_{LNG}$. When one performs the unit conversion with a 91 percent efficiency, you get 43.89 kWh/1,000 gal LNG--the figure in the unnumbered table on page 89 of Appendix C. The derivation of this value is shown below.

	Incorrect Derivation **Assumes LNG Storage (As a Transportation Fuel)**		
A	Heating Value	84,820 BTU / gallon	HHV Fuel Spec GREET
B	Conversion BTU to kW-h	3412.14 BTU / kW-h	Constant
C	Total Energy / unit LNG	1,607 BTU_{energy} / $MMBTU_{LNG}$	GREET Value below for Energy Consumption
D	Convert to kW-h / MMBTU(LNG)	0.47 kWh_{energy} / $MMBTU_{LNG}$	= C / B
E	Convert to kW-h / (1) BTU(LNG)	4.71E-07 kWh_{energy} / BTU_{LNG}	= D / 1E6
F	Convert to kW-h / gallon(LNG)	0.04 kWh_{energy} / $gallon_{LNG}$	= E / A
G	Energy / 1000-gallons	**40 kWh_{energy} / 1000-$gallon_{LNG}$**	= F * 1000
	Assuming 91% LOSS	**43.89 kWh_{energy} / 1000-$gallon_{LNG}$**	= F / 0.91 ← **Incorrect**

However, 1,607 $Btu_{energy}/MMBtu_{LNG}$ is the CA_GREET default factor for the energy associated with storage of LNG. The CA_GREET default factor for the energy associated with both liquefaction and storage of LNG is 125,772 $Btu_{energy}/MMBtu_{LNG}$. When one performs the unit conversion from the correct energy consumption value, you get 3,623 kWh/1,000 gal LNG.

	Correct Derivation Natural Gas to Liquefied Natural Gas (As a Transportation Fuel)		
A	Heating Value	84,820 BTU / gallon	HHV Fuel Spec GREET
B	Conversion BTU to kW-h	3412.14 BTU / kW-h	Constant
C	Total Energy / unit LNG	125,772 BTU_{energy} / $MMBTU_{LNG}$	GREET Value below for Energy Consumption
D	Convert to kW-h / MMBTU(LNG)	36.86 kWh_{energy} / $MMBTU_{LNG}$	= C / B
E	Convert to kW-h / (1) BTU(LNG)	3.69E-05 kWh_{energy} / BTU_{LNG}	= D / 1E6
F	Convert to kW-h / gallon(LNG)	3.13 kWh_{energy} / $gallon_{LNG}$	= E / A
G	Energy / 1000-gallons	**3,126 kWh_{energy} / 1000-$gallon_{LNG}$**	= F * 1000
	Assuming 91% LOSS	**3,623 kWh_{energy} / 1000-$gallon_{LNG}$**	= F / 0.91 ← Correct

As shown in Table 9 below, a comparison of Tacoma LNG's power consumption value of 1,348 kWh/1,000 gal LNG to the correct CA_GREET derived power consumption value of 3,623 kWh/1,000 gal LNG demonstrates how energy efficient the Tacoma LNG facility will be.

Table 9. Energy Efficiency of the Tacoma LNG Facility

Tacoma LNG (kWh/1,000 gal LNG)	CA_GREET (kWh/1,000 gal LNG)
1,348	3,623

The DSEIS should be revised to accurately reflect the CA_GREET figure for liquefaction and storage as well as to note the high energy efficiency of the proposed facility.

Comment #8: The carbon balance on page 92 of Appendix A to the LCA Report contains errors.

The "Annual Throughput" figure on page 92 (Appendix A) of the LCA Report, which is Appendix C of the DSEIS contains several minor technical errors. Specifically, we have identified the following corrections for PSCAA's consideration:

- The amount of natural gas exiting the LNG Pretreatment system annually should be corrected to 322,354 tonnes, not 315,523 tonnes as shown in the DSEIS mass balance figure. The mass balance shows 326,239 tonnes of natural gas entering LNG Pretreatment and 3,885 tonnes exiting as "Pretreatment fired NG." The difference is 322,354 tonnes, not 315,523 tonnes.
- The amount of LPG produced annually should be corrected to 8,910 tonnes, not 8,722 tonnes as calculated in the DSEIS mass balance figure. Because the mass of natural gas exiting the pretreatment increases by 6,831 tonnes natural gas (322,354 tonne NG –

315,523 tonne NG = 6,831 tonne NG), the amount of LPG production will increase by 188 tonnes.

- The CO_2 produced annually by flaring the LPG should be corrected to 24,083 tonnes, not 23,573 tonnes as calculated in the DSEIS. Using a value of 8,910 tonnes LPG, CO2 emissions will increase by 510 tonnes CO2.
- The CO_2 produced annually for the facility should be corrected to 95,164 tonnes, not 94,654 tonnes as calculated in the DSEIS. Adding 510 tonnes CO2 to the facility total brings the total emissions to 95,164 tonnes.

The corrected values are summarized in Table 10 below.

Table 10. Carbon Balance Corrections

DSEIS Calculated (Incorrect)	Correct Value
315,523 tonne NG	322,354 tonne NG
8,722 tonne LPG	8,910 tonne LPG
23,573 tonne CO2 from flared LPG	24,083 tonne CO2 from flared LPG
94,654 tonne CO2 Facility Total	95,164 tonne CO2 Facility Total

While these are not significant differences, the FSEIS should be revised to reflect accurate values.

Comment #9: Table C.1 in Appendix C incorrectly identifies natural gas data as "placeholder data."

Table C.1 in Appendix C of the LCA Report, which, in turn, is Appendix C of the DSEIS incorrectly suggests that natural gas carbon content, heating value and the CO_2 emission factor are interim "placeholder" values. Our understanding is that the emission factors stated in Table C.1 are never used in the analysis so perhaps this is an editing oversight because this table does not have to be included in the appendix. However, if the table is to be included, there are minor errors that should be corrected. For example, the higher heating value ("HHV") for natural gas stated in Table C.1 is 1,054 Btus/scf. However, the correct value (which is accurately shown in the "Input" sheet of the supporting spreadsheets at cell C90) is 1,090 Btus/scf. Again, if Table C.1 is to be included in the FSEIS, the values should be corrected to reflect the values used in the actual analysis. While not affecting the conclusions in the DSEIS, it is confusing for Table C.1 to inaccurately reference "placeholder data" and to reflect values inconsistent with the DSEIS spreadsheets.

1328-10 10. LCA Calculations
1328-11 17. LCA Inputs and Assumptions - Peak Shaving
1328-12 10. LCA Calculations

Comment #10: Note "a" in Table C.2 of Appendix C incorrectly states that natural gas properties will be recalculated based on requested data.

Table C.2, Note "a" in Appendix C of the LCA Report, which, in turn, is Appendix C of the DSEIS incorrectly states that "Natural gas properties will be recalculated based on data that has been requested." Note "a" also indicates that the fuel properties in Table C.1 match those on the "Fuel_Specs" sheet in the supporting spreadsheets. However, PSE responded to the PSCAA information requests on May 25, 2018--over four months prior to completion of the LCA Report in Appendix C. Therefore, the language in Note "a" appears to be out of date and should be removed. We also note that the fuel values in Table C.2 should be amended to match the numbers in the "Fuel_Specs" sheet of the underlying spreadsheets.

Comment #11: The DSEIS misstates the amount of LNG that would be gasified during times of peak demand.

There are inconsistencies in the DSEIS about the amount of LNG that would be gasified during peak demand periods. Section ES.2 of DSEIS inaccurately states "During times of peak gas demand, 85,000 dekatherms of NG would be re-gasified and re-injected into PSE's distribution system." However, in Section 2.3.4 the DSEIS accurately states that the vaporization system would have the capacity to deliver 66 MMSCF/day (i.e., 66,000 Dth/day) of natural gas at standard distribution pipeline pressure. We believe that the confusion may stem from language in the FEIS which speaks of the Proposed Action being to "re-inject and divert approximately 85,000 Dth/day." (emphasis added). The FEIS was accurate in this description, but that does not mean the entire 85,000 Dth/day is from re-gasified natural gas. As described in Section 1.3.4.1 of the BID, the Tacoma LNG facility will have the capacity on a peak demand day to re-gasify up to 66,000 Dth/day of gas from storage, but can add additional supply by diverting up to 19,000 Dth of natural gas that would normally be delivered to the facility for liquefaction. Therefore, Section ES.2 of DSEIS should be revised to state "During times of peak gas demand, 66,000 dekatherms of natural gas per day would be re-gasified and re-injected into PSE's distribution system and 19,000 dekatherms of NG per day would be diverted from being routed to the liquefaction plant and be left in the pipeline for consumer use."

Similar to our other comments, this is not a significant error that affects the overall DSEIS conclusions, but nonetheless should be corrected.

Comment #12: Table A.11 in the LCA Report contains values that should be corrected.

Table A.11 in Appendix C of the LCA Report, which, in turn, is Appendix C of the DSEIS includes incorrect values. For example, Table A.11 indicates that 2,299 gallons of LNG are lost per bunkering event. The sheet entitled "PSE_LNG_Operations" in the DSEIS spreadsheet contains the value of 114 gallons per event. The latter value reflects the assumptions built into

1328-12 cont'd 10. LCA Calculations
1328-13 17. LCA Inputs and Assumptions - Peak Shaving
1328-14 21. LCA Inputs and Assumptions - Additional Air Pollutants

the DSEIS spreadsheet and the 2,299 gallon value currently in Table A.11 is inconsistent with what is actually used in the DSEIS spreadsheets. Table A.11 appears to have had the wrong data populated into many of the cells in the table and should be corrected to avoid confusion. These corrections to the table do not alter the conclusions of the DSEIS because the spreadsheets are accurate.

Comment #13: Section 2.3.4 of the DSEIS incorrectly suggests that the LNG that is re-gasified and injected into the pipeline during peak demand periods would be used for electricity generation.

Section 2.3.4 of the DSEIS states "GHG emissions would also occur during the combustion of the natural gas in the power generation facility associated with peak shaving." This statement is incorrect. During a peak demand period when the immediately available gas supply is insufficient, PSE's priority is residential and commercial natural gas customers. At such a time, the Tacoma LNG facility would gasify LNG in storage and re-inject this natural gas into the pipeline for use by its residential and commercial natural gas customers. As explained in Section 1.3.6.3 of the BID:

> The Tacoma LNG Facility would also enable PSE to avoid repurposing firm gas transmission from peak period electricity generation to residential gas service. In the absence of the Tacoma LNG Facility, during peak periods PSE would have to use this firm gas transmission to supply gas customers and thus would be required to operate "peaker" dual-fuel combustion turbine electric generating units utilizing fuel oil rather than using natural gas. The additional GHG emissions attributable to use of fuel oil in dual-fuel combustion turbine electric generating units is not quantified in this analysis, but will occur if the Project is not built.

As this provision makes clear, one benefit of the project is that during peak demand periods, PSE has the ability to vaporize LNG and put that natural gas into the pipeline to supply residential and commercial gas service. None of the peak shaving natural gas would be supplied to electricity generation. The natural gas used for electricity generation is in a separate portfolio of gas resources designated for PSE's electricity generation. Tacoma LNG is an exclusively natural gas customer gas supply resource.

Comment #14: The SEIS must accurately calculate emissions of black carbon and organic carbon relative to the Action and No Action Alternatives.

As noted above, the 2018 IPCC Special Report recommended an increased focus on reduction of short-term climate forcers such as black carbon and organic carbon. Black carbon is a

component of $PM_{2.5}$ generated primarily by the incomplete combustion of fossil fuels.[18] Black carbon emissions are estimated to be the second or third largest contributor to current warming, after CO_2 and methane. Black carbon influences climate by directly heating surrounding air when suspended in the atmosphere, by reducing the reflectivity of the earth's surface when deposited (an effect particularly strong over snow and ice), and through additional indirect effects related to interaction with clouds. Black carbon has a tremendous impact locally and along the Canadian and Alaska coastlines on snow and ice fields, not to mention on human health.

One of the critical benefits presented by the proposed project is that it will result in a substantial decrease in black carbon emissions from vessels. PSCAA has appropriately included black carbon and organic carbon calculations in the DSEIS spreadsheets. However, those calculations contain errors that we presume are due to incorrect fuel assumptions (in the absence of the Tacoma LNG project TOTE vessels will run on diesel and not bunker fuel).[19] Whatever the reason for the mistakes, the FSEIS should be corrected as outlined below:

1. The "End use TOTE - Fuel Oil Vessel" sheet references incorrect BC/OC ratios for transit, maneuvering and hoteling emissions in cells Q44:R44, Q45:R45 and Q46:R46, respectively. For example, the transit black carbon emissions for the fuel oil vessel are calculated in cell Q44 using the following formula:

   =H44*BC_OC Ratios'!$C$6/100

   Where:
   H44 = PM2.5 emissions
   BC_OC Ratios'!$C$6 = the black carbon percentage for a natural gas fired engine

   The correct "BC_OC Ratios" sheet reference should be to cell O6, for a diesel-fired engine. In other words, the spreadsheet is calculating black carbon emissions for a fuel oil-fired vessel using the black carbon percentage of PM2.5 specific to a natural gas-fired engine. The formula should reference BC_OC Ratios'!$O$6, the correct BC percentage for a diesel-fired engine and consistent with the PM2.5 emissions factors used for an MGO-fueled marine vessel engine.

2. The Emissions Factors tables in rows 63 through 90 of the "End use TOTE - Fuel Oil Vessel" sheet misapply the Fuel Correction Factors. The formulae in these cells use

[18] https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-4-4-3.html.
[19] See comments 4 and 5 above.

emission factors contained in Table B.2 (cells D8:K17 of the "EF Marine Vessels spec. TOTE" sheet), and reflect emissions of an ocean going vessel operating on 0.1% S MDO as reported in the 2016 Puget Sound Maritime Air Emissions Inventory.[20] The Emissions Factors tables in rows 63 through 90 of the "End use TOTE - Fuel Oil Vessel" sheet then apply Fuel Correction Factors to the 0.1% MGO emissions rates. The Fuel Correction Factors are shown in Table 3.22 (cells B96:L105 of the "EF Marine Vessels spec. TOTE" sheet). However, these Fuel Correction Factors are intended to adjust emissions factors from a baseline of 2.7%S HFO (the baseline in the 2011 Puget Sound Maritime Air Emissions Inventory), not the 0.1% MGO baseline used in the current analysis.[21] By applying these Fuel Correction Factors to the updated baseline emissions factors for 0.1% MGO shown in Table B.2, particulate emissions for the fuel oil-fired vessel are incorrectly reduced by 83%.

3. Cells Q44:Q46 and R44:R46 of the "End use TOTE - Fuel Oil Vessel" and "End use TOTE-LNG Vessel" sheets are intended to represent the tonnes per trip values for black carbon and organic carbon, respectively, for each of the three phases of transportation. The values in cells Q48 and R48 of these two sheets are intended to represent the sum of the values for each of the phases. However, the values in cells Q48 and R48 of both of these two sheets are hard-entered numbers and do not reflect the sum of values above them.

Correcting these errors results in a four-fold increase in black carbon emissions associated with the TOTE Fuel Oil Vessel and a halving of the organic carbon emissions.

It is also noted that Table B.12 (cells B58:K60 of "EF Marine Vessels spec. TOTE") contains an error for the PM10 emissions rate of a fuel oil auxiliary boiler. The listed value is 16 g/kW-hr. The correct value is 0.16 g/kW-hr, as reported in the 2016 Puget Sound Maritime Air Emissions Inventory. Because the PM10 emissions rates of auxiliary boilers are assumed to be the same for fuel oil and natural gas, this error doesn't create a relative emissions difference between the two fuels. However, the error should still be addressed so as to ensure that the SEIS is accurate.

Given the substantial climate forcing impacts of black carbon, PSCAA must accurately address these emissions in the analysis. Failure to do so would cause the FSEIS to understate the life cycle benefits of the Proposed Action. The errors in the spreadsheets identified above should be corrected and the black carbon and organic carbon impacts of the Action Alternative as

[20] htbtps://pugetsoundmaritimeairforum.files.wordpress.com/2018/10/final-2016-psei-report-19-oct-2018-scg.pdf
[21] See, Section 3.6.10, Table 3.22 of the 2011 Inventory ("emission factors were given for engines using residual fuel with an average 2.7% sulfur content.")
https://pugetsoundmaritimeairforum.files.wordpress.com/2016/06/2011pseireportupdate_20130523.pdf

compared to the No Action Alternative should be identified. While more commonly considered in the context of the 20-year horizon, it is important that even this 100-year horizon assessment recognize the huge benefit achieved by reducing black carbon emissions and reducing the substantial effects that black carbon has on the glaciers and snow fields that lie in immediate proximity to Pacific Northwest maritime traffic.

We have included as an attachment to this letter a set of revised spreadsheets that include a toggle ("Input" sheet; cells H30 and H31) that allow you to consider the black carbon and organic carbon impacts ("Input" sheet; cell H30) as well as to correct the inaccurate black carbon and organic carbon computations ("Input" sheet; cell H31).

Comment #15: The DSEIS uses an appropriate methane emission rate for marine LNG-fired engines.

Recent data lend further support for the use of the methane emission rate for marine LNG-fired engines that is in the DSEIS. The DSEIS relies upon the June 13, 2017 SINTEF report (Table 7.2) for the methane emission rate value for an LNG-fired LPDF 4-stroke engines. The 5.3 g/kW-hr value was derived from actual tests on two ships equipped with Low Pressure Dual Fuel ("LPDF") engines. Since the time of that report and preparation of the DSEIS, MAN Energy Solutions ("MAN"), the company upgrading the TOTE propulsion system to LNG, has performed its own testing. As described in the attached October 26, 2018 letter, MAN has tested methane emissions for a converted MAN 58/64 engine as part of their engineering development program. This engine is the equivalent of those that will power the MV Midnight Sun and MV North Star on LNG once fully converted. When adjusted for density to match the conditions of the SINTEF report, the emission rate is 5.3 g/kW-hr. Note that MAN compares their tested value to the value reported in the SINTEF report reflecting the average of actual tests and manufacturer testbed data. MAN's value comes out at exactly the same rate (5.3 g/kW-hr) as the other *in situ* tests. This lends tremendous credibility to the value used in the DSEIS.

Comment #16: PSCAA is correct to employ the AR4/100-year assumptions in assessing life cycle GHG emissions under the Action and No Action Alternatives.

At the public hearing held on October 30, 2018, multiple commenters suggested that PSCAA should apply AR5, 20-year average Global Warming Potentials ("GWPs") instead of the AR4, 100-year average GWPs employed in the DSEIS. The stated justification for this shift, which several other commenters acknowledged would put the SEIS at odds with Washington's statutes, rules and policies, was the belief that because a recent IPCC study says significant action must be taken in the next 12 years, that the average GWPs must more closely match this period. This comment reflects a misunderstanding of the SEIS process, what the IPCC report says, and the policy underlying the 100-year GWP horizon.

Focusing on a 20-Year Average GWP as Opposed to a 100-Year GWP Inaccurately Minimizes the Long Term Effect of Carbon Dioxide on Climate Change

GWP is the ratio between the climate warming effect of 1 tonne of a non-CO2 GHG and the climate warming effect of 1 tonne of CO2 had each been emitted on the same day. The IPCC has estimated that the average relative GWP for methane over the first 20 years after it is emitted is 86 (without climate-carbon feedbacks).[22] This means that over 20 years (and with no consideration beyond 20 years) the average relative global warming potential of 1 ton of methane equals that of 86 tonnes of CO2.

Because GWP is a ratio (as opposed to an absolute number) the relative decline in CO2 and methane distort the 20-year average GWP value. Specifically, over the first 3.3 years, the fraction of a tonne of CO2 emitted that remains in the atmosphere declines faster than methane. Thus methane's GWP over the first three years goes up notwithstanding the fact that its levels are declining significantly over that time period. This artificially inflates the global warming effect of methane during that 3.3-year period.

More importantly, half of methane's global warming effect has occurred within 8.6 years of being emitted and 3/4 of its effect has occurred within 17.2 years of being emitted. By 100 years, the direct effect of methane on global warming drops to negligible levels, with the fraction of remaining methane decreasing to 0.000009 percent, while slightly less than 40 percent of the CO2 is still present.[23] As the IPCC has stated, "About half of a CO2 pulse to the atmosphere is removed over a timescale of 30 years; a further 30% is removed within a few centuries; and the remaining 20% will typically stay in the atmosphere for many thousands of years."[24] Climate researcher, David Archer, et al., concluded that "climate effects of CO2 releases to the atmosphere will persist for tens, if not hundreds, of thousands of years into the future."[25] The authors of that paper cautioned against even limiting consideration to the 100-year horizon given the longevity of CO2.

Because methane is reduced by roughly 98 percent within the first 50 years, but it takes tens of thousands of years to reach the same reduction in CO2 stocks, it is bad policy to focus on the 20-year average GWP values. This ignores the much greater long-term impact that an equivalent

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[22] IPCC; Anthropogenic and Natural Radiative Forcing (2013); https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf
[23] Fugitive Methane and the Role of Atmospheric Half-Life; *Geoinfor Geostat: An Overview 5:3.* https://www.scitechnol.com/peer-review/fugitive-methane-and-the-role-of-atmospheric-halflife-bu53c.php?article_id=6097
[24] IPCC Fourth Assessment Report; TS 2.1.1; https://www.ipcc.ch/publications_and_data/ar4/wg1/en/tssts-2-1-1.html
[25] Atmospheric Lifetime of Fossil Fuel Carbon Dioxide; Annu. Rev. Earth Planet. Sci. (2009); http://climatemodels.uchicago.edu/geocarb/archer.2009.ann_rev_tail.pdf.

amount of CO2 has for centuries into the future. As the IPCC noted, "Adoption of a fixed horizon of e.g., 20, 100 or 500 years will inevitably put no weight on the long-term effect of CO2 beyond the time horizon."[26] Simply ignoring the impacts of CO2 after 20 years, as the 20-year average GWP does, makes no sense from a policy point of view and is why all creditable policy making organizations rely upon the 100-year horizon. The 100-year average GWP still understates the long-term impact of CO2 as opposed to methane, but it gives a more accurate sense of the long-term impacts.

The 2018 IPCC Special Report on the Impacts of Global Warming Does Not Suggest That it is Necessary or Appropriate to Rely on the 20 Year Average GWP

In October 2018, the UN Intergovernmental Panel on Climate Change ("IPCC") released a Special Report on the impacts of global warming exceeding 1.5 degrees Celsius above preindustrial levels. The Paris Climate Accord commits to actions to stay below an increase in global temperatures of 2 degrees Celsius but to also pursue actions that would strive to keep increases in temperature to 1.5 degrees Celsius. The report concludes that to stay below an increase of 1.5 degrees Celsius, greenhouse gas emissions will need to be reduced by 45% from 2010 levels by 2030 and 100% (net zero) below 2010 levels by 2050. Nowhere does that report state that it is appropriate to use the 20-year average GWP in place of the 100-year average GWP as a policy tool. Doing so would mean that climate impacts are only considered for the first 20 years and effects after 20 years are not considered.

The 2018 IPCC Special Report does discuss the need for an increased focus on reduction of short-term climate forcers such as methane and black carbon. Methane reduction through industry and governmental efforts to reduce leakage in natural gas production such as those already underway in British Columbia is identified as a key tool that is highly achievable and has economic benefits as well. Reduction in black carbon emissions through reductions in diesel emissions is also identified as a pathway that not only has highly significant short-term climate reduction potential, but also has significant corollary public health benefits. However, the 2018 IPCC Special Report's focus on addressing short-term climate forcers is distinct from saying that policymakers should stop considering the long-term relative impacts of greenhouse gases. Some greenhouse gases, such as CO2, will be around for millennia, while others, such as methane, will essentially be gone in a few decades or less. There are benefits and tradeoffs related to each. However, governments must make decisions based on the long-term impacts to climate.

The 2018 IPCC Special Report does not specifically recommend a particular pathway or scenario to be followed. However, it does identify the consequences of inaction and identifies a number of methods that can be chosen by policy makers.

[26] IPCC; Anthropogenic and Natural Radiative Forcing (2013); https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf

In the context of the Tacoma LNG project, use of LNG as a marine fuel is consistent with a number of the identified alternative pathways in the report. Substituting LNG for oil in ship engines reduces climate emissions directly and also reduces black carbon, creating not only long- and short-term climate benefits, but improvements to public health through reduced exposure to diesel particulates. The use of British Columbia natural gas is also consistent with the identified pathways. As part of the Pan-Canadian Framework on Clean Growth and Climate Change, the Canadian government committed to reduce methane emissions from the oil and gas sector by 40 to 45 percent from 2012 levels by 2025. In April 2018, Environment and Climate Change Canada ("ECCC") adopted federal methane regulations to deliver on this commitment.[27] These regulations included the requirement that by January 1, 2020, well completions involving hydraulic fracturing must prevent fugitive releases. British Columbia has charted an even more aggressive course than the Canadian national government by setting its own aggressive targets of reducing Province-wide greenhouse gas emissions by 18 percent (relative to 2007 levels) by 2016, 33 percent by 2020 and 80 percent by 2050.[28] By committing to its natural gas feedstock coming exclusively from British Columbia, Tacoma LNG is supporting responsible development from a region that is aggressively pursuing greenhouse gas reductions. This pathway is consistent with the pathways outlined in the 2018 IPCC Special Report.

Use of AR4/100-year average GWPs is consistent with Washington, PSCAA, and U.S. EPA policy, in addition to that adopted by the Paris Accord

As noted by many commenters at the October 30 hearing, federal and state GHG reporting regulations and all major GHG policy considerations and goals, including those of the State of Washington, U.S. EPA, PSCAA, the Paris Accord and the Kyoto Protocol, are based on the AR4/100-year average GWPs. At page 4-5 of the DSEIS PSCAA states correctly that it is applying the GWP factors because it is the currently accepted international reporting standard and the methodology for State of Washington GHG reporting. Neither the State of Washington, U.S. EPA, PSCAA, the Paris Accord nor the Kyoto Protocol have adopted the AR5 GWPs and it would be inappropriate for PSCAA to adopt those standards here. Emissions are reported using these assumptions and goals are based on these assumptions. As explained above, the basis for this approach is that focusing on the 20-year average GWP eliminates consideration of the long-term impact of CO2 and other GHGs. Maintaining consistency when making policy considerations is key.[29] Also, compelling reasons exist for looking at the long-term impacts of emissions on climate change.

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[27] See, e.g., https://www.canada.ca/en/environment-climate-change/news/2018/04/federal-methane-regulations-for-the-upstream-oil-and-gas-sector.html.
[28] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_07042_01.
[29] We note that even if 20 year average GWP values are assessed, a correct analysis incorporating the impacts of black carbon demonstrates that the Action Alternative results in a substantial net reduction in GHG emissions.

Comment #17: Although PSCAA has not been presented with a permit application for liquefaction of 500,000 gallons of LNG per day, there is no error in assessing that amount in the context of the SEIS.

There was confusion at the October 30 hearing about the end use contemplated for LNG in excess of the amount to be consumed by TOTE, peak shaving and truck transfers (the "unallocated LNG"). The primary purposes of the Tacoma LNG facility would be to provide LNG for marine vessel fuel and to PSE customers by re-gasification during times of peak demand (i.e., peak shaving). A small amount of LNG would be capable of transfer by truck. At either a 250,000 or 500,000 gallon per day production volume, there would be additional unallocated LNG available for maritime use.

PSE has only requested authority from PSCAA to build and operate a facility with the capacity to produce 250,000 gallons per day of LNG. This is based exclusively on the use of the infrastructure proposed in the Notice of Construction ("NOC") application. In order to perform a complete life cycle analysis of the greenhouse gas emissions associated with both a 250,000 and 500,000 gallon per day scenario, it was assumed that all remaining LNG not used by TOTE, for on-road heavy duty trucking or for peak shaving would be combusted in other marine vessels. All of this unallocated LNG was assumed to be transferred into barges on the Blair Waterway; no bunkering could occur in the Hylebos Waterway. Methane losses associated with the bunkering process and emissions associated with marine combustion were calculated and included in the spreadsheets on the "Direct End use" sheet. Different fuel transfer alternatives might be considered in the future if a market is identified. At that time, should modifications to the Tacoma LNG facility be necessary, all appropriate environmental review and permitting processes would be conducted.

As part of the original Proposed Action, the FEIS studied the Tacoma LNG Facility's ability to liquefy between 250,000 and 500,000 gallons per day. The DSEIS prepared by PSCAA to study GHG emissions consistently analyzes the facility's ability to generate up to 500,000 gallons of LNG per day. PSCAA's decision to review the environmental impacts of the Proposed Action at 500,000 gallons per day as studied in the original FEIS is appropriate. However, environmental review and environmental documents such as an FEIS or FSEIS do not constitute permits–they simply inform decision-makers when reviewing permit applications. Here, the NOC permit application submitted by PSE asks PSCAA to approve a facility that is limited to a daily average production capacity of 250,000 gallons. PSE would need to seek additional NOC permitting in the future to modify the 250,000 gallon per day amount of LNG sought by the NOC before PSCAA. There is no error in PSCAA's decision to review the Proposed Action at 500,000 gallons per day of capacity consistent with the FEIS, and there is no bar to PSE's ability to seek approval for a facility that is smaller than the maximum studied.

Comment #18: PSCAA is not reviewing a proposal for export of LNG to foreign markets.

At least one commenter at the October 30 hearing wrongly asserted that PSE is going to use Tacoma LNG for export of LNG to another country. This assertion is incorrect. The Tacoma LNG Project is not and cannot be operated as an LNG export facility. LNG import and export terminals are subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC"), which is the only agency in the United States that has authority to certify such facilities. The Tacoma LNG Facility is not a FERC-certificated export terminal.

Beyond the legal inability to operate the Tacoma LNG Facility as an export terminal, the proposal lacks the physical ability to perform as one. The Tacoma LNG Facility is sized only to serve the needs of natural gas customers and TOTE vessels: the project NOC is for authorization to "produce up to 250,000 gallons of fuel-grade (to satisfy PSE's supply agreement with TOTE) LNG per day, and store up to 8 million gallons of LNG on site." Even assuming all 250,000 gallons per day were diverted away from TOTE and natural gas customers (something PSE cannot do legally), it would take six months of round-the-clock daily production at 250,000 gallons per day just to produce enough LNG to fill one LNG export tanker. Beyond PSE's legal and physical inability to produce the volumes necessary for LNG export, there is no existing infrastructure at the Tacoma LNG Facility, and none proposed, that could fuel such a vessel.

PSE appreciates this opportunity to comment on the DSEIS relating to our proposed Tacoma LNG project. We recognize and appreciate the tremendous effort that PSCAA and its contractors have invested in this document. We hope that our comments are accepted in the constructive manner in which they are intended. We believe strongly that the best SEIS is one that is accurate and firmly rooted in established approaches. We recognize that some of our comments are complicated technically and may merit or be best addressed through real-time discussion. As you review our comments if additional information is needed from PSE, as the project applicant, we will make the PSE Team available at any time.

Ultimately, we believe that the DSEIS reached an accurate conclusion in determining that the Action Alternative will result in a net decrease in GHG emissions. This conclusion is reached based on an established approach that is consistent with the procedures adopted by PSCAA, the State of Washington, U.S. EPA and reflected in the Paris Accord and the Kyoto Protocol. We believe that the edits identified in this letter and addressed (in regards to comments 4, 5, 6 and 14) through revisions to the spreadsheets should be incorporated into the FSEIS.[30] These edits

[30] Again, we note that the changes in the spreadsheet needed to address comment #6 simply requires changing a toggle in the spreadsheet version released for public comment to be consistent with the text. There is no dispute that

will make the FSEIS more accurate, but they do not alter the fact that by building and operating the Tacoma LNG facility, PSE will be helping to reduce GHG emissions in addition to helping reduce NOx, SO2 and particulate emissions.

With the conclusion of the comment period, PSE looks forward to expeditious issuance of the Final SEIS so that we can proceed with the application for a minor source Notice of Construction from PSCAA. When it commences operation, the Tacoma LNG project will result in the reduction of criteria pollutants and greenhouse gases. We look forward to being able to recognize those benefits for the community as soon as possible.

Please do not hesitate to contact the PSE team if you have any questions or would like to set up a meeting. The team contact is Keith Faretra who can be reached at keith.faretra@pse.com or (425) 456-2561.

Sincerely,



Steve R. Secrist on behalf of David Mills
Senior Vice-President, Policy and Energy Supply

Attachments:

- October 25, 2018 letter from MAN to TOTE re emissions test results
- Spreadsheets reflecting changes in letter

cc: Craig Kenworthy

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the sole potential source of electricity for the proposed project is Tacoma Power and that Tacoma Power's generation portfolio is significantly greener than the state-wide average for Washington.

MAN Energy Solutions

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United States of America

Augsburg, October 26, 2018

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MV Midnight Sun & MV North Star

Emission Information regaring Methane after the 58/64 conversion to Dual-Fuel operation.

Dear Ladies and Gentlemen,

Herewith we would like inform you about the requested values regarding the Methane values of the converted 58/64 engine to Dual-Fuel Operation for the vessels MV Midnight Sun and MV North Star.

The provided data from the SINTEF report dated 2017-06-13 have been used for a comparison with the values we have derived in the meantime.

Our provided values are only for information and not binding since we are in the development process according to schedule.

MAN Energy Solutions

		E2-Cyclus Factor Methane [g/kWh]	Density [kg/m³]
SINTEF Report 2017-06-13		6,9	0,78
MAN Augsburg			
	Preliminary 07/2018	4,7 @ 75% only	0,536
	Comparable to SINTEF	5,3	0,78

As a result, we are at least 23% of CH4 below the SINTEF value at a comparable density which has been used as a reference value for the study. The overall GHG should be much better than the stated 13,5%.

We hope that we have provided the requested information. If you should have any questions, please do not hesitate to contact us any time.

Yours sincerely,
MAN Energy Solutions

i.V. Spindler

Dr. Thomas Spindler
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Head of Upgrades & Retrofits
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Dr. Alexander Knafl
Vice President
Head of Advanced Engineering
& Exhaust Aftertreatment
Engineering 4-Stroke

GENERAL INPUTS

Date: 21-Sep-18
Version: 17

Comments/Source

LNG Plant Operation

LNG Product - End use share

LNG Production	Scenario A End use share	gal/day	lb/day	Mgal/ year	tonne/ year	Scenario B Enduse share	gal/day	lb/day	Mgal/ year	tonne/ year	Check gal/year (365)	Source: PSE-BID	Scenario A Volume Data
Total	**100.0%**	**250,000**	**907,193**	**88.75**	**146,083**	**100.00%**	**500,000**	**1,814,384**	**177.50**	**292,165**	182,499,845		**250,000**
On-site Peak Shaving	11.0%	27,397	99,418	9.73	16,009	5.48%	27,397	99,418	9.73	16,009	10,000,000		27,397
Gig Harbor Peak Shaving	0.0%	0	0	-	0	1.00%	5,000	18,144	1.78	2,922	1,825,000		0
On-road Trucking	0.0%	0	0	-	0	2.00%	10,000	36,288	3.55	5,843	3,650,000		0
TOTE Marine	42.7%	106,849	387,732	37.93	62,435	21.37%	106,849	387,732	37.93	62,435	39,000,000		106,849
Truck-to-Ship Bunkering	0.0%	0	0	-	0	1.00%	5,000	18,144	1.78	2,922	1,825,000		0
Other Marine (by Bunker Barge)	46.3%	115,753	420,043	41.09	67,638	69.15%	345,753	1,254,659	122.74	202,034	126,199,845		115,753

Results	-6.89%	-47.96 ktonne/year

Scenario Selection for End use Mix

Scenario		Comment
Enduse Scenario	A	Pull Down

Sub- Scenario		Comment
LPG is flared	Yes	Pull Down

EER for Marine		Range
	1 Type in	1 to 1.015

Used GEN MIX		
Pwr Mix	Washington	WA Pull Down
Natural Gas Upstream		GHGenius Pull Down

Overall Operational Hours

Overall Operational Hours	hours/year	days/year
LNG Liquefaction Plant	8,520	355.0
LNG Pretreatment	8,520	355.0
LNG Flaring	8,760	365.0
LNG Vaporizer	240	10.0
Emergency Diesel Generator	500	20.8

GWP Basis		
AR Version	AR4	Pull Down
Timeframe	100	Pull Down
BC/OC	No	Pull Down
Correct BC/OC Ratios	No	Pull Down
Correct FCFs	Yes	Pull Down
Correct Fuel Heating Value	Yes	Pull Down

Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

Energy/Electrcity Consumption LNG Plant

Scenario A Equipment Capacity/Consumption		PSE Estimate (mmBtu/hr)	Fuel	Calculated (mmBtu/hr)	Input for 250,000 gal /day
LNG Pretreatment	NG WPG heater	9	NG		9
LNG Pretreatment	NG Regenerator heater	1.6	NG		1.6
Waste gas flaring	Waste Gas Heat Input	35.6		67.8	35.6
LPG in Waste Gas		77	LPG		
Waste Gas, Mass Balance		88	C2/C5+		
Vaporizer	LNG Heater Capacity	66			66
		(gal/h)			
Emergency equipment	Diesel genrator	104.6	Diesel		104.6

WPG: Water Propylene Glycol

Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 118
Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 115
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 120
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

LNG pretreatment CO_2 seperation efficiency **99.760%** Actual result based on LNG composition

Power Consumption LNG plant	Baseline	
LNG Production	1,348	kWh/1000 gal
Vaporizer	45	kWh/1000 gal

Source: page 13, PES response

Input

1328

Overall Mass Balance

Mass Input/Output: Based on 500,000 gal/day	NG Feed lb / Day	LNG Output lb / Day	Mass ratio NG/LNG	Density LNG g/gal	Density LNG lb/gal
	1,012,995	907,013	1.1168	1,646	3.629

Calculated specs for Feed Gas, Emissions and Products

Component	NG - fired NG	Pretreatment Vent	To LNG	Waste Gas	LPG	Tacoma LNG
	mol%	mol%	mol%	mol%	mol%	mol%
CH4	91.31%	0.00%	5.12%	5.01%	5.36%	94.36%
C2H6	6.07%	0.00%	55.73%	79.83%	2.86%	4.32%
						0.00%
C3H8	1.54%	0.00%	21.83%	1.59%	66.26%	0.83%
i-C4H10	0.22%	0.00%	3.72%	0.27%	11.28%	0.10%
n-C4H10	0.24%	0.00%	4.55%	0.33%	13.79%	0.09%
i-C5H12	0.05%	0.00%	1.08%	1.41%	0.34%	0.01%
n-C5H12	0.03%	0.00%	0.81%	1.18%	0.00%	0.01%
C6+	0.03%	0.00%	0.84%	1.23%	0.00%	0.00%
N2	0.27%	54.81%	0.04%	0.05%	0.00%	0.28%
CO	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2S	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
O2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
He	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO2	0.22%	45.19%	6.29%	9.11%	0.10%	0.01%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
C factor (lb CO2/mmBtu)HHV	118.11	0.00	136.68	136.87	136.42	116.87
C factor (lb CO2/scf)	0.1287	0.0000	0.2741	0.2339	0.3625	0.1236
LHV (MJ/kg)	49.0	0.0	43.3	41.5	46.2	49.5
(g C02/mmBtu), LHV	59333.7	0.0	68663.1	68755.6	68532.5	58709.2
average molar weight	17.7	35.2	36.9	32.8	45.8	17.0
mol "C" per mol gas	1.11	0.45	2.36	2.01	3.12	1.06
carbon weight %	75.22%	15.40%	76.88%	73.74%	81.81%	75.10%
Carbon factor, gC 02/MJ	56.2	0.0	65.1	65.2	65.0	55.6
g CO2/mmBtu, LHV	59,333	0	68,662	68,755	68,531	58,708
Btu/scf (LHV)	983.9	0.0	1811.0	1542.8	2399.4	964.7
Btu/scf (HHV)	1089.7	0.0	2005.6	1708.6	2657.4	1057.3
MJ/m3	36.7	0.0	67.5	57.5	89.4	35.6
SG	0.610	1.216	1.272	1.132	1.581	0.587
Density (g/ft3)	21.2	42.2	44.1	39.3	54.9	20.4
Density (g/m3)	747.9	1490.2	1558.8	1386.3	1937.1	719.3
	mol/d	mol/d	mol/d	mol/d	mol/d	mol/d
CH_4	94.536	0.000	0.181	0.121	0.059	94.356
C_2H_6	6.284	0.000	1.967	1.935	0.032	4.317
C_3H_8	1.598	0.000	0.771	0.039	0.732	0.828
i-C_4H_{10}	0.232	0.000	0.131	0.007	0.125	0.101
n-C_4H_{10}	0.250	0.000	0.160	0.008	0.152	0.090
i-C_5H_{12}	0.049	0.000	0.038	0.034	0.004	0.011
n-C_5H_{12}	0.035	0.000	0.029	0.029	0.000	0.007
C_6+	0.031	0.000	0.030	0.030	0.000	0.001
N_2	0.281	0.281	0.001	0.001	0.000	0.280
CO	0.000	0.000	0.000	0.000	0.000	0.000
H_2	0.000	0.000	0.000	0.000	0.000	0.000
H_2S	0.000	0.000	0.000	0.000	0.000	0.000
O_2	0.000	0.000	0.000	0.000	0.000	0.000
He						
CO_2	0.232	0.232	0.222	0.221	0.001	0.010
Total	103.5	0.5	3.5	2.4	1.1	100.0

947.8171227

1646

75.574	77.156	81.40344129 MJ/gal

1.1075 0.902934537 0.902935

Mass	NG Feed	CO2	Flare	Waste Gas	LPG	LNG
	t/d	t/d	t/d			t/d
CH_4	1516.5	0.0	2.9	1.9	1.0	1513.6
C_2H_6	188.9	0.0	59.1	58.2	1.0	129.8
	0.0	0.0	0.0	0.0	0.0	
C_3H_8	70.5	0.0	34.0	1.7	32.3	36.5
i-C_4H_{10}	13.5	0.0	7.6	0.4	7.2	5.8
n-C_4H_{10}	14.5	0.0	9.3	0.5	8.9	5.2
i-C_5H_{12}	3.6	0.0	2.7	2.5	0.3	0.8
n-C_5H_{12}	2.5	0.0	2.1	2.1	0.0	0.5
C_6+	2.6	0.0	2.5	2.5	0.0	0.1
N_2	7.9	7.9	0.0	0.0	0.0	7.8
CO	0.0	0.0	0.0	0.0	0.0	0.0
H_2	0.0	0.0	0.0	0.0	0.0	0.0
H_2S	0.0	0.0	0.0	0.0	0.0	0.0
O_2	0.0	0.0	0.0	0.0	0.0	0.0
He	0.0	0.0	0.0	0.0	0.0	0.0
CO_2	10.2	10.2	9.8	9.7	0.1	0.4
Total	1830.7	18.1	130.1	79.5	50.6	1700.7
Mass ratio, base LNG	1.0765	0.0106	0.0765	0.0467	0.0298	1.00
	4,704	46	334	204	4,370	

1.0000

Upstream inputs

Natural Gas upstream WA	Emissions (g/mmBtu), LHV			
Processing Step	CO_2	CH_4	N_2O	CO_{2e}
Natural Gas Extraction	2,356	8.91	0.02	2,876.19
Extraction Fugitive	0.00	135.74	0.00	3,691.60
Natural Gas Processing	1,845	4.37	0.01	2,252.37
Processing Fugitive	778	6.83	0.00	1,246.31
Transmission & Storage	377	13.68	0.30	1,017.00
Transmisison Fugitive	0.00	19.19	0.00	777.75
Total	**5,355**	**189**	**0**	**10,371**

Natural Gas upstream BC FORTIS GIG HARBOR

Natural Gas upstream BC	Emissions g/mmBTU (UHV)			
	CO2	CH4	N2O	
Natural Gas Extraction	2,356	9	0	2876.188209
Fugitive Emissions	0	136	0	3691.599287
Natural Gas Processing	1,845	4	0	2252.371857
Transmission	778	7	0	1246.305073
Total	**4,978**	**156**	**0**	9172.464426
				298

Natural Gas upstream from PSE for Lower Sensitivity

Natural Gas upstream BC	Emissions g/mmBTU (UHV)			
	CO2	CH4	N2O	#VALUE!
Natural Gas Extraction and processing	6,030	46	0.16	#VALUE!
Transmission	824	6	0.02	7465.5
				1269.5
				365.5
				298
Total	**6,854**	**51**	**0**	8437
Distribution	10	2	0.00	

Power generation			Emissions (g/kWh)		
Processing Step	Code		CO_2	CH_4	N_2O
Washington	WA	Upstream	8.2	0.3800	0.0010
		Power Plants	196.0	0.0100	0.0030
Tacoma	TA	Upstream	1	0.0454	0.0001
		Power Plants	27	0.0003	0.0003
Marginal	MA	Upstream	20	0.6462	0.0026
		Power Plants	212	0.0090	0.0014
eGRID NWPP	NW	Upstream	11	0.5569	0.0010
		Power Plants	297	0.0107	0.0047

Upstream Life Cycle Data. Source: GHGenius for BC, GREET NA Natural Gas, PSE FEIS for BC inventory

GHGenius			GREET			BC Inventory		
CO2	CH4	N2O	CO2	CH4	N2O	CO2	CH4	N2O
2355.558703	8.905180223	0.020759	2126.915308	8.040794784	0.018744431	6,030	46	0
	135.7439715			122.5679201		824	6	0
1845.075523	4.371853334	0.014211	1665.982414	3.947497367	0.012831328			
777.5358703	6.830768106		702.0639913	6.167736439				
377	13.68	0.295	1650.744077	17.69875777	1.253646641			
	19.19			40.36132186				

Table 3. 2015 GHG Emissions Rates for Natural Gas Production, Transmission, and Distribution in British Columbia

BC Natural Gas GHG Emissions (grams/MMBTU)	CO_2	CH_4	N_2O	CO_{2e}
Natural Gas Production and Processing	6,030	45.5	0.16	7,216
Oil and Natural Gas Transmission	824	5.9	0.02	978
Natural Gas Distribution	10	2.3	0.00	67
Total	6,863	53.7	0.18	8,260
Total Ex-Distribution	6,853	51.5	0.18	**8,193**

Crude Oil Resource Mix	U.S. Average
API Gravity	31.2
Imported Oil	43.80%
Canadian Oil Sands	10.30%
Refinery Efficiency	
Residual Oil	94.83%
Diesel	90.92%
Product Transport	
% Marine Vessel	29%
Average Distance	8,373

	Emissions (g/mmBtu), LHV		
Processing Step	**CO_2**	**CH_4**	**N_2O**
U.S. Bunker Fuel			
Crude Oil Production	12,627		
Extraction Fugitive			
Crude Oil Refining	4,049	10.49	0.07
Processing Fugitive			
Transport	419	0.69	0.01
Transport Fugitive			
Total U.S. Bunker Fuel	**17,095**	**11**	**0**
U.S. Diesel Fuel			
Crude Oil Production	13,155		
Extraction Fugitive			
Crude Oil Refining	7,386	20.46	0.14
Processing Fugitive			
Transport	376	0.66	0.01
Transport Fugitive			
Total U.S. Diesel Fuel	**20,918**	**21**	**0**
U.S.Gasoline Fuel			
Crude Oil Production	11,533		
Extraction Fugitive			
Crude Oil Refining	13,232		
Processing Fugitive			
Transport	491		
Transport Fugitive			
Ethanol blending	-1,006		
Total WA. Gasoline Fuel	**24,251**	**0**	**0**

INPUTS - NO PROJECT

Diesel fuel storage pumping	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to vehi	0.01

Loss of LNG Peak Shaving - Boiler oper	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to boile	0.01

ENDUSE

Gig harbor Delivery

Distance for LNG delivery by Diesel Tru	miles
Project	17
No Project	175

Truck capacity	gallons/trip
Capacity per trip	10,000

Energy Consumption	BTU/mile
	17,738

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
NEW LNG Plant					
Construction Emissions					
Total Construction			**1,581**	**63,232**	**18**
Direct (Equipment)			182	7,289	2.1
Upstream Life Cycle (Equipment)			20	812	0.2
Upstream Life Cycle (Power)			57	2,262	0.6
Upstream Life Cycle (Material)			1,322	52,869	14.9
Operational Emissions					
Upstream Life cycle			**103,949**	**4,157,958**	**1,171**
Natural Gas			77,208	3,088,319	870
Power LNG production			25,739	1,029,541	290
Diesel Emergency			143	5,730	2
Power LNG Vaporizer -Peak Shaving			859	34,369	10
Gig harbor Diesel truck fuel			0.0	0	0.00
Direct LNG Plant			**52,251**	**2,090,030**	**589**
LNG Production			46,714	1,868,553	526
Vaporizer -On-site Peak Shaving			942	37,674	11
Marine vessel bunkering, truck CH4			4,595	183,803	52
End Use LNG	**88.75**	**6,848**	**490,443**	**19,617,710**	**5,526**
On-site Peak Shaving	9.73	750	43,854	1,754,145	494
Gig harbor LNG	0.00	0	0.0	0	0
On-road Trucking	0.00	0	0	0	0
TOTE Marine	37.93	2,927	207,659	8,306,355	2,340
TOTE Marine Diesel Pilot fuel			7,000	279,992	79
Truck-to-Ship Bunkering	0.00	0	0	0	0
Truck-to-Ship Bunkering Pilot Fuel			0	0	0
Other Marine LNG (by Bunker Barge)	41.09	3,171	224,375	8,975,012	2,528
Other Marine Diesel Pilot Fuel			7,555	302,207	85
Total Emissions (Tacoma LNG)			**648,223**	**25,928,931**	**7,304**

NO ACTION

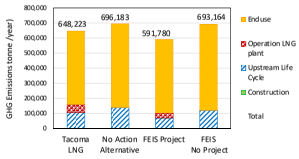
Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Upstream Displaced Emissions					
Total Upstream			**137,573**	**5,502,902**	**1,550.11**
No Peak Shaving - Diesel Dual Fuel		750	16,127	645,097	182
Upstream Gig harbor Peak Shaving		0	0	0	0.00
Upstream On-road trucking		0	0	0	0
Upstream TOTE Marine Diesel		3014	64,775	2,591,007	730
Upstream Truck-to-Ship Bunkering		0	0	0	0
Upstream Other Marine Diesel (by Bunker Barge)		3257	56,670	2,266,797	639
End Use Emissions					
Total End Use Diesel /Fuel Oil/LNG	**55.1**	**7,022**	**558,611**	**22,344,434**	**6,294**
Diesel Peak Shaving for Power	5.89	750	58,891	2,355,620	664
Gig harbor LNG	0.00	0	0	0	0.00
On-road Trucking	0.00	0	0	0	0
TOTE Marine Diesel	23.65	3,014	240,326	9,613,048	2,708
Truck-to-Ship Bunkering	0.00	0	0	0	0
Other Marine Diesel (by Bunker Barge)	25.55	3,257	259,394	10,375,765	2,923
Total Emission (No Action)			**696,183**	**27,847,335**	**7,844**
Net Emission reduction			**-47,960**	**-1,918,404**	**-540**
in percentage			-6.89%	-6.89%	-6.89%

Short tables

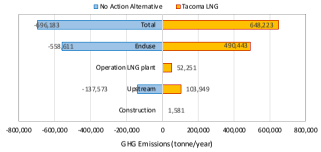
Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Tacoma LNG					
Construction			**1,581**	**63,232**	**18**
Upstream Life cycle			**103,949**	**4,157,958**	**1,171**
Direct LNG Plant			**52,251**	**2,090,030**	**589**
End Use LNG	**88.75**	**6,848**	**490,443**	**19,617,710**	**5,526**
On-site Peak Shaving	9.73	750	43,854		
Gig harbor LNG	0.00	0	0		
On-road Trucking	0.00	0	0		
TOTE Marine	37.93	2927	207,659		
TOTE Marine Diesel Pilot fuel	0.00	0	7,000		
Truck-to-Ship Bunkering	0.00	0	0		
Truck-to-Ship Bunkering Pilot Fuel			0		
Other Marine LNG (by Bunker Barge)	41.09	3171	224,375		
Other Marine Diesel Pilot Fuel			7,555		
Total	**88.75**	**6,848**	**648,223**	**25,928,931**	**7,304**
NO ACTION					
Upstream Life Cycle			**137,573**	**5,502,902**	**1,550**
Total End Use Diesel /Fuel Oil/LNG	**55.09**	**7,022**	**558,611**	**22,344,434**	**6,294**
Diesel Peak Shaving for Power	5.89	750	58,891		
Gig harbor LNG	0.00	0	0		
On-road Trucking	0.00	0	0		
TOTE Marine Diesel	23.65	3,014	240,326		
Truck-to-Ship Bunkering	0.00	0	0		
Other Marine Diesel (by Bunker Barge)	25.55	3,257	259,394		
Total	**55.09**	**7,022**	**696,183**	**27,847,335**	**7,844**
Net Emissions		-6.89%	**-47,960**	**-1,918,404**	**-540**
				-6.89%	-6.89%

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GHG Emissions (tonne/year)	Tacoma LNG	No Action Alternative	FEIS Project	FEIS No Project
Construction	1,581			
Upstream Life Cycle	103,949	137,573	69,299	119,238
Operation LNG plant	52,251	0	33,539	0
Enduse	490,443	558,611	488,942	573,926
Total	648,223	696,183	591,780	693,164
Net Emissions	**-47,960**		-101,385	
	-0.068890041		-14.63%	



GHG Emissions (Gbtu/ year)	No Action Alternative	Tacoma LNG	Net Emissions
Construction		1,581	
Upstream	-137,573	103,949	
Operation LNG plant	0	52,251	
Enduse	-558,611	490,443	
Total	-696,183	648,223	-47,960



Direct End Use
Scenario: 250,000 gal/year

Scenario A

LNG Enduse	Equipment Type	Consumption Mgal/yr	GBtu, LHV/yr	EER	Btu/gal	
Power Peak Shaving						
LNG	Dual Fuel Turbine	9.73	750	1	77,156	9.726027
Displaced Diesel	Dual Fuel Turbine	5.89	750		127,464	5.887317
Gig Harbor LNG						
LNG	NG Boiler	0.00	0	1	77,156	1.775
LNG	NG Boiler	0.00	0		77,156	1.775
On-road Trucking						
						ARB LNG Pathway
LNG	Truck Engine	0.00	0	0.9	77,156	3.55 document
Diesel	Truck Engine	0.00	0		127,464	1.933981
TOTE Marine						
loss factor LNG	Marine Engine	37.93	2,927	1	77,156	37.93151
Pilot diesel Fuel for LNG	Marine Engine	0.69	88	1	127,464	0.625559
Displaced MDO Fuel	Marine Engine	23.65	3,014		127,464	21.47753
Truck-to-Ship Bunkering						
loss facor LNG	Marine Engine	0.00	0	1	77,156	1.775
Pilot Fuel for LNG	Marine Engine	0.00	0		127,464	0.029273
Displaced MDO Fuel	Marine Engine	0.00	0		127,464	1.005038
Other Marine (by Bunker Barge)						
LNG	Marine Engine	41.09	3,162	1	77,156	122.7423
Pilot Fuel for LNG	Marine Engine	0.74	95	1	127,464	2.024243
Displaced MDO Fuel	Marine Engine	25.55	3,257		127,464	69.49901
Total LNG		88.750	6,839			

T 4.2

Scenario A GHG Emissions	Equipment Type	Emissions (tonne/year) CO_2c	CH_4	N_2O	CO_2e		
Power Peak Shaving							B
LNG	Duct Firing	43,755	1	0.26	43,854		43853.64
Diesel	Duct Firing	58,682	0	0.69	58,891		58890.5
Gig Harbor Delivery							
Diesel LNG Tacoma	Truck Engine	0	0	0.00	0.0		4.200144
Diesel LNG	Truck Engine	0	0	0.00	0		43.17362
LNG Tacoma End Use	NG Boiler	0	0	0	0		8143.21
LNG End Use	NG Boiler	0	0	0	0		8143.21
On-road Trucking							
LNG	Truck Engine	0	0	0.00	0		17862.04
Diesel	Truck Engine	0	0	0.00	0		19315.93
TOTE Marine							
LNG	Marine Engine	157,787	1,864	11	207,659		226164.6
Pilot fuel	Marine Engine	6,899	0	0.33	7,000		7611.397
MDO Fuel	Marine Engine	236,870	4	11.29	240,326		261324.6
Truck-to-Ship Bunkering							
LNG incl. Pilot fuel	Marine Engine	0	0	0.00	0		10575.31
Pilot fuel	Marine Engine	0	0	0.00	0		356.1743
						NET 0 difference	0
Diesel Truck	Truck Engine	0	0	0.00	0		12228.65
MDO Fuel	Marine Engine	0	0	0.00	0		
Other Marine (by Bunker Barge)							
							Marine Fuel +
LNG	Marine Engine	170,489	2,014	12	224,375		70955.01 Operations losses
Pilot fuel	Marine Engine	7,455	0	0.33	7,555		24399.05
MDO Fuel	Marine Engine	255,938	4	11.29	259,394		837700.8

Assume barge delivers MDO for displaced emissions

Scenario A

LNG Enduse	Mgal/yr	GBtu, LHV/yr
Power Peak Shaving	9.73	750
Gig Harbor LNG	0.00	0
On-road Trucking	0.00	0
TOTE Marine	37.93	2,927
Truck-to-Ship Bunkering	0.00	0
Other Marine (by Bunker Barge)	41.09	3,162
Total LNG	88.750	6,839

Tacoma LNG Emissions

Scenario A			Emissions (tonne/year)			
LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**	
On-site Peak Shaving						
LNG	Dual Fuel Boiler	43,755	1	0	43,854	
Gig. harbor Delivery						
LNG Tacoma	Truck Engine	0	0	0	0	
LNG Tacoma End Use	NG Boiler	0	0	0	0	
On-road Trucking						
LNG	Truck Engine	0	0	0	0	
TOTE Marine						
LNG	Marine Engine	157,787	1,864	11	207,659	
Pilot fuel	Marine Engine	6,899	0	0	7,000	
Truck-to-Ship Bunkering						
LNG incl. Pilot fuel	Marine Engine	0	0	0	0	
Pilot fuel	Marine Engine	0	0	0	0	
Diesel Truck	Truck Engine	0	0	0	0	NET 0
Other Marine (by Bunker Barge)						
LNG	Marine Engine	170,489	2,014	12	224,375	
Pilot fuel	Marine Engine	7,455	0	0	7,555	
Total End Use		**386,385**	**3,879**	**24**	**490,443**	

Non Action

Scenario A

		Emissions (tonne/year)			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		15,697	15.8	0.1	16,125
Diesel - Power pumping		2	0.0	0.0	2
Diesel - End use	Dual Fuel Boiler	58,682	0.1	0.7	58,891
Gig. harbor Delivery					
LNG	Truck Engine	0	0.0	0.0	0
LNG End Use	NG Boiler	0	0.0	0.0	0
On-road Trucking					
Diesel	Truck Engine	0	0.0	0.0	0
TOTE Marine					
MDO - Upstream		63,055	63.6	0.4	64,775
MDO fuel	Marine Engine	236,870	3.6	11.3	240,326
Truck-to-Ship Bunkering					
MDO Fuel	Marine Engine	0	0.0	0.0	0
Other Marine (by Bunker Barge)					
MDO - Upstream		55,679	36.4	0.3	56,670
MDO fuel	Marine Engine	255,938	3.6	11.3	259,394
Total End Use		**670,224**	**107**	**24**	**680,056**

Scenario A		Emissions (tonne/year), LHV			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		15,697	16	0	16,125
Diesel - Power pumping	Power	2	0	0	2
Diesel - End use	Dual Fuel Boiler	58,682	0	1	58,891
Total		**74,380**	**16**	**1**	**75,017**

Direct End use

LCA

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Extraction	2,356	8.9	0.021	2,584
Extraction Fugitive	0	135.7	0.000	3,394
Natural Gas Processing	1,845	4.4	0.014	1,959
Processing Fugitive	778	6.8	0.000	948
Transmission & Storage	377	13.7	0.295	807
Transmisison Fugitive	0.0	19.2	0.000	480
Total Natural Gas	**5,355**	**189**	**0.3**	**10,172**

Energy Input/Output: Based on 250,000 gal/day	NG Feed	LNG Output	ratio NG/LNG	NG Btu/gal LNG	
NG Feed (lb/day)	1,012,995	907,013	1.1168		with Loss Factor
LHV (based on mass ratio see INPUT	21,348	19,285	1.107	85,407	85,528
LHV, Btu/gal	21,074	21,262			

Natural Gas upstream LNG	GHG Emissions (kg/1000 gal LNG)				
	CO_2	**CH_4**	**N_2O**	**CO_2e**	just CH4
Natural Gas upstream	458.0	16.1	0.0	869.9	403.5
					35,813
					179,064

Source: Provided Report BID page 14

Power generation			Emissions (g/kWh)			
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Washington	WAUP	Upstream	8.2	0.3800	0.0010	18
	WAPP	Power Plants	196.0	0.0100	0.0030	197
Tacoma	TAUP	Upstream	1.3	0.0454	0.0001	2
	TAPP	Power Plants	27.4	0.0003	0.0003	27
Marginal	MAUP	Upstream	19.7	0.6462	0.0026	37
	MAPP	Power Plants	212.3	0.0090	0.0014	213
eGRID NWPP	NWUP	Upstream	11.5	0.5569	0.0010	26
	NWPP	Power Plants	297.2	0.0107	0.0047	299
Selected GEN MIX	**WA**					
Washington	**WAUP**	**Upstream**	**8.2**	**0.3800**	**0.0010**	**18**
	WAPP	**Power Plants**	**196.0**	**0.0100**	**0.0030**	**197**

Power Consumption LNG Construction	Baseline	GHG Emissions (tonnes)			
Power Total during construction (kWh)	10,512,000	CO_2	CH_4	N_2O	CO_2e
Mix	**WAUP**	**2,146.6**	**4.1**	**0.0**	**2,261.6**

Power Consumption LNG Production	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	1348	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**275.3**	**0.5**	**0.0**	**290.0**

Power Consumption Vaporizer / Peak Shaving	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	45	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**9.2**	**0.0**	**0.0**	**9.7**

Comparision to reported values
Provided BID Report page 4

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Production & Processing	6,030	45.5	0.160	7,215
Transmission & Storage	824	5.9	0.0	977
Natural Gas Distribution	10	2.3	0	68
Total	6,864	53.70	0.18	8,260
Total Ex-Distribution	**6,854**	**51.40**	**0.18**	**8,193**

Table 9. Tacoma Power Generating Mix (2016)

Fuel Type	Percentage Used
Hydro Power	84%
Nuclear*	6%
Coal*	2%
Natural Gas	1%
Wind	7%

*Represents a portion of the power Tacoma Power gets from the Bonneville Power Administration.

Table 10. Upstream GHG Emissions Associated With Facility Electrical Energy Use
Source: Provided Report BID page 14

Power Consumption LNG Production		Upstream Emissions from Tacoma Power Supply							
		VOC	CO	NOx	BC	OC	CH4	N2O	CO2
Emissions Rate	grams/mmBTUel	0.65	1.63	3.83	0.02	0.05	10.92	0.09	5942.00
per Power	g/kWhel	0.00	0.01	0.01	0.00	0.00	0.04	0.00	20.27
Emissions Rate	g/mmBTU LNG	0.04	0.101	0.237	0.001	0.003	0.674	0.006	367.1
of End product	**kg/ 1000 gal**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**27.99**

NO PROJECT

Diesel fuel storage pumping	**Consumption, Estin**	**Emissions (g/mmBtu), LHV**			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to vehicle	0.01	2.042	0.004	0.000	2.151
Total		2.042	0.004	0.000	2.151

NO PROJECT

Loss of LNG Peak Shaving - Boiler operation with	**Consumption, Estin**	**Emissions (g/mmBtu), LHV**			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to boiler	0.01	2.042	0.004	0.000	2.900
Total		2.042	0.004	0.000	2.900

Crude Oil Resource Mix	**U.S. Average**	**WA**
API Gravity	31.2	30.8
Imported Oil	43.80%	37.10%
Canadian Oil Sands	10.30%	13.20%
Refinery Efficiency		
Residual Oil	94.83%	94.80%
Diesel	90.92%	90.90%
Product Transport		
% Marine Vessel	29.02%	46.00%
Average Distance	8,373.0	2,470.0

	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
WA. Bunker Fuel				
Crude Oil Production	12,627	0	0	12,627
Extraction Fugitive	0	0	0	0
Crude Oil Refining	4,049	10.491	0.073	4,333
Processing Fugitive	0	0.000	0.000	0
Transport	419	0.692	0.009	439
Transport Fugitive	0	0.000	0.000	0
Total U.S. Bunker Fuel	**17,095**	**11.18**	**0.082**	**17,399**
WA Diesel Fuel				
Crude Oil Production	13,155	0	0.0	13,155
Extraction Fugitive	0	0	0.0	0
Crude Oil Refining	7,386	20	0.1	7,939
Processing Fugitive	0	0	0.0	0
Transport	376	1	0.0	395
Transport Fugitive	0	0	0.0	0
Total U.S. Diesel Fuel	**20,918**	**21.11**	**0.144**	**21,488**
WA.Gasoline Fuel				
Crude Oil Production	11,533	0.0	0.0	11,533
Extraction Fugitive	0	0.0	0.0	
Crude Oil Refining	13,232	0.0	0.0	13,232
Processing Fugitive	0	0.0	0.0	
Transport	491	0.0	0.0	491
Transport Fugitive	0	0.0	0.0	
Ethanol blending	-1,006	0.0	0.0	-1,006
Total WA. Gasoline Fuel	**24,251**	**0.0**	**0.0**	**24,251**

PROJECT

Diesel fuel for emergency genset	**Consumption**	**Emissions (kg/1000 gal), LHV**			
Processing Step	**mmBtu/ 1000 gal LNG**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Upstream Diesel production	0.0751137	1.57	0.00	0.00	1.6
Total		2	0	0	1.6

PROJECT

Gig Harbor Diesel Truck fuel

Upstream Diesel production	Consumption	Emissions (tonne/yr), LHV			
Processing Step	mmBtu/year	CO_2	CH_4	N_2O	CO_2e
LNG Project	0.00	0.00	0.00	0.00	0.00

Upstream GHG Emissions for Tacoma LNG

Pollutant	CO_2	CH_4	N_2O	CO_2e	Use Rate
Emissions (kg/1000 gal), LHV					
Upstream Natural Gas	458.0	16.1	0.0	869.9	85,528 Btu/gal
Upstream Power LNG production	275.3	0.5	0.0	290.0	1.35 kWh/gal
Upstream Diesel Emergency	1.57	0.00	0.00	1.6	75.1 Btu/gal
Upstream Power LNG Vaporizer	9.2	0.0	0.0	9.7	0.045 kWh/gal
Total Upstream	**744.0**	**16.7**	**0.0**	**1171.3**	

NO PROJECT

	Upstream LNG/Diesel/Bunker fuel production	Consumption		Emissions (tonne/yr)			
	Processing Step	GBtu/year	Fuel	CO_2	CH_4	N_2O	CO_2e
D	No Peak Shaving - Diesel Boiler operation	750	Diesel	15,697	16	0.11	16,125
N	Gig harbor NG & LNG production	0	Natural Gas	0	0.0	0.0	0
D	Gig harbor Diesel truck fuel	0.00	Diesel	0.0	0.00	0.00	0.0
D	Diesel Storage On-road trucking	0	Diesel	0	0.0	0.00	0
B	TOTE Marine Diesel	3,014	MDO	63,055	64	0.43	64,775
B	Truck-to-Ship Bunkering	0	MDO	0	0.0	0.00	0
D	Other Marine Diesel	3,257	MDO	55,679	36	0.27	56,670
	Total			134,431	116	0.8	137,570
							137,573

DO NOT PRINT

Tacoma LNG Plant

Total NG end use	**6,839 GBtu, LHV/year**
On-site Peak Shaving	750 GBtu, LHV/year
LNG Output	6,089 GBtu, LHV/year

LNG Preatreatment

Operational hours	8,520 hr/yr
NG WPG heater	9 mmBtu/hr
	76,680 mmBtu/year
NG Regenerator heater	1.6 mmBtu/hr
	13,632 mmBtu/year
Total Annual Consumption	**90,312 mmBtu/year**
CO2 seperation efficiency	99.76%

Waste gas Flare

Operational hours	8,760 hr/yr
Waste Gas Flow	40,417 scf/hr
Waste Gas Heat Capacity	35.6 mmBtu/hr
Total Heat Input	**311,856 mmBtu/yr**
Seperated CO2	

Vaporizer

Operational hours	240 hr/yr
LNGg Heater Capacity	66.00 mmBtu/hr
Total Consumption	15,840 mmBtu Fuel gas
Power requir. (Grid)	0.04500 kWh/gal
	0.00347 kWhel/mmBtu
	(estimate need of 1830 Btu/gal LNG)

Emergency equipment

Diesel genearator ULSD	
Operational hours	500 hr/yr
Capacity	1,500 kW
Electricity generation	750,000 kWh/yr
Diesel consumption	104.6 gal/h
	52,300 gal/year
	6,666 mmBtu/year
	164.3 tonne/year

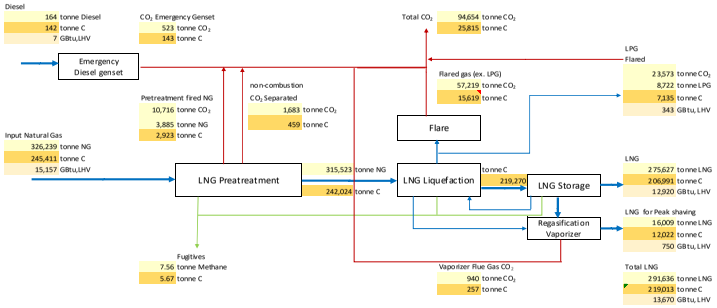
Liquefaction

Power requirs. (Grid)	1.35 kWh/galLNG
Operational hours Liqu.	8,520 hr/year

Fugitives - Refrigerant losses through Compressor Seals

	tonne/year
Methane	3.78

Annual throughput



The carbon balance accounts for the hydocarbons and CO_2 in the natural gas such that the carbon entering the LNG system is equal to the carbon in the combustion gas, fugitive emissions and LNG. Carbon in the Flared gas ex. LPG is determined by difference. Inputs to the analysis include overall NG to LNG mass balance, and fired pretreament NG. Waste gas to flare is based on elemental composition and mass flows.

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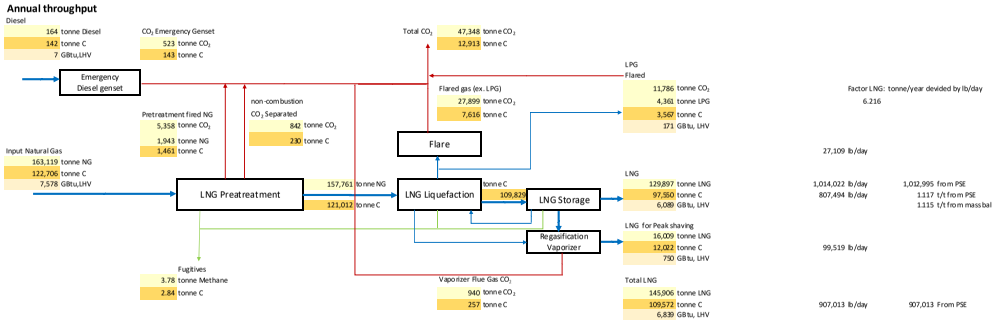
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Carbon Mass balance

	Input,ouput		CO_2	Methane	C content		
	lb/day	tonne/yr	ton ne/yr	tonne/yr	**tonn e/yr**	**Comments**	**Source**
Input NG							
Natural gas	1,012,995	163,119			**122,706**		
Total NG Input	1,012,995	163,119			**122,706**		
Products							
LPG, estimated	0	0			**0**	A	
LNG	907,013	145,906			**109,572**		
Total Products	907,013	145,906			**109,572**		
Emissions							
Pretreatment			5,358		**1,461**		Heater fired by NG and boil off gas (BOG). BID response p8.- 9 page 12 PSE-BID
CO_2 Separated (non-combustion)			842		**230**	B	Using Gas composition and given separation efficiecy
Flaring (combustion)			27,057		**7,616**		Flaring is used to close C-Balance
Flaring from LPG (combustion)			11,786		**3,567**		Using gas composition calculation and EF of LPG boiler (no flar data)
Fugitives CH_4				3.78	**3**		Using given inventoru see Sheet Fugitives **95**
Vaporizing onside peak shaving			940		**257**		Boiler primary fuel is NG. Hoveve r, the fuel gas mix can include compressed boil-off gas (BOG) . BID response p.9
Total Emissions			45,983	4	**13,133**		
Total Product + Emissions			45,983	4	**122,706**		
Total NG Input - Product + Emissions					**0**		

Comments:
A: How much LPG is produced as product? LPG production is not mentioned in the Response.
B: In the FEIS report page 103 the value is 10,703tonne/year. Could you clarify this?

Annual throughput



The carbon balance accounts for the hydocarbons and CO_2 in the natural gas such that the carbon entering the LNG system is equal to the carbon in the combustion gas, fugitive emissions and LNG. Carbon in the Flared gas ex. LPG is determined by difference. Inputs to the analysis include overall NG to LNG mass balance, and fired pretreament NG. Waste gas to flare is based on elemental composition and mass flows

LNG PLANT

Direct Combustion Emission Rate		Emission Factor (g/mmBtu), LHV			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	Boiler, NG	59,330	1.06	0.35	59,461
Wastegas flaring	Flare	68,662	1.06	1.07	59,660
LPG Flaring	Flare	68,773	1.07	1.07	69,118
Emergency Generator	Diesel Genset	78,187	4.22	0.60	78,472
Vaporizer	Boiler, NG	1,252	0.02	0.01	1,255
Vaporizer	Pump Power	1	0.00	0.00	1.0

		Emissions (tonne/year)			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	Boiler, NG	5,358	0.10	0.03	5,370
WasteGas Flaring	Flare	27,899	0.43	0.43	28,039
LPG flaring	Flare	11,786	0.18	0.18	11,846
Emergency Generator	Diesel Genset	521	0.03	0.00	523
Non-combustion CO2 from pretrea	Vent/Flare	842	0.00	0.00	842
Fugitives	Equip. Leaks	0	3.78	0.00	95
Sub - Total		**46,406**	**5**	**1**	**46,734**
Vaporizer	Boiler	940	0	0	942
Vaporizer	Pump - power	0.7	0.0	0.0	0.8
Fugitives					
Fugitives Ship/Barge Loading	Equip. Leaks	0.0	6.9	0.0	171.7
Fugitives - Bunker Vessel Storage	Equip. Leaks	0.0	176.9	0.0	4,423.4
Fugitives - Truck to Ship	Equip. Leaks	1.0	0.0	1.0	0.0
Total		**47,348**	**188**	**2**	**52,252**

Info for Table

		Emissions (tonne/year)			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
Vaporizer	Boiler	940	0	0	942
Vaporizer	Pump - power	0.7	0.0	0.0	0.8

Flare Check

27,066

	Specific Emission g/mmBtu (LNG product)			
Process	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	783.4	0.0	0.0	785.2
Emission from flaring (co	4079.2	0.1	0.1	4099.7
Emission from LPG flaring	1723.4	0.0	0.0	1732.0
Emergency Generator	76.2	0.0	0.0	76.5
Non-combustion CO2 fror	123.1	0.0	0.0	123.1
Fugitives	0.0	0.6	0.0	13.8
Sub - Total	**6785.3**	**0.7**	**0.1**	**6830.2**

Total	6,923	28	0	7,640

BUNKERING

LNG Bunkering and Vessel loading Emissions	CH_4 (g/mmBTU delivered)	CO_2e (g/mmBTU delivered)	Fraction of Gas Delivered by this Process
Ship/Barge Loading	2.4	58.82	100%
Bunker Vessel Storage	6.4	160	52%
Truck/Ship-to-Ship Transfer	0.0	0	0%
Total	8.8	142	
GREET			

Explain losses

10000 gal
0.5 L
0.2 g
0.00025

loss

Loss Factor	0.1413% Gas lost through the system
Net Delivered LNG	380,000 gallons per typical bunkering event

Bunker Barge Loading

Vapor Displaced	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_{2e} Emissions (g/mmBTU)
0.22%	95.00%	0.011%	380,994	41.9	2.4	59

Bunker Vessel Storage

Boil off rate (%/day)	Duration (days)	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_{2e} Emissions (g/mmBTU)
0.15%	4	95.00%	0.0300%	380,952	114	6.4	160

New ships have 0.1% loss

Truck/Ship-to-Ship Transfer

Vapor Displaced	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_{2e} Emissions (g/mmBTU)
0.22%	0.00%	0.22%	380,838	838	47.0	1,176

Bunkering and Transfer Fugitives	Volume (LNG gallons/year)	Loss Factor	CH_4 Emissions (LNG Gallons/year)	CH_4 Emissions (tonne/ year)	CO_{2e} Emissions (tonne/year)	Check if exist
TOTE	37,931,507	0.0110%	4,173	7	172	1
Other Bunker Barge	41,092,466	0.2616%	107,493	177	4,423	1
Truck-to-Ship Bunkering	0	0.2205%	0	0	0	0
Total	**79,023,973**	**0.1413%**	**111,666**	**184**	**4,595**	

https://www.maritd.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf

Source: 2018-05-25 PSE Submittal page 78, table LNG Bunkering Emissions
see also https://www.maritd.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf

TOTAL

Total LNG plant emission	Emissions (tonne/year) CO_2	CH_4	N_2O	CO_2e	C	2 x CO_2e FEIS	See: BID p 12, and also BID REPORT, ATTACHMENT F (1 page)
LNG Pretreatment Boiler	5,358	0.10	0.03	5,370	1,464	9,860	uses EF of 53.06 kg/mmBtu for NG See EXCEL 2018 05-25 Tacoma I
Pretreatment CO2	842			842	230		
Flare waste Gas	27,899	0	0	28,039	7,617	56,262	FEIS uses EF provided by CB&I and flare vendor See EXCEL 2018 0!
Flare LPG	11,786	0	0	11,846	3,218	Included above	
Fugitives	0	3.78	0.00	95	5	190	
Emergency Generator	521	0.03	0.00	523	143	536	
Sub-Total	**46,406**	**4.52**	**0.65**	**46,714**	**12,677**	0.0	0 Waste gas for heater
Vaporizer	940	0.02	0.01	942	257		
Marine Vessel Bunkering, truck	0	183.80	0.00	4,595	185	1,684	
Total	**47,346**	**4.54**	**0.66**	**47,656**	**12,934**	68,532	

Source: BID REPORT, ATTACHMENT F (1 page)

LNG plant	Emissions (tonne CO_2e/year) CO_2	CH_4	N_2O	CO_2e
Flare	27,110	40.0	0.0	28,131
Vaporizer	841	0.0	0.0	842
WPG	4,183	0.1	0.0	4,186
Regen	744	0.0	0.0	744
Diesel Generator	534	0.0	0.0	536
Fugitives	--	--	--	95
Total	**33,411**	**41**	**0**	**34,533**

Propane Volume

12284 kg/day
6388 gal/day

Energy Efficiency

Input	Unit	Tacoma	CA_GREET
NG	lb/lb LNG	1.117	1.109
Electricity	kWh/1000 gal LNG	1,348.00	43.89

Adjust results to 355 days of operation instead of 365, 88.75 Mgal/year instead of 91.25 Mgal/ 0.97260274

Scenario A	Project			No Project			Project			No Project		
	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)
Extraction, processing, and transmission to Sumas hub							**7,070,485**	**0.00%**	**57,931**	**727,762**	**0.00%**	**5,963**
Transmission from Sumas Hub to PSE gate							**7,067,158**	**0.05%**	**5,727**	**727,419**	**0.05%**	**589**
Distribution via PSE System							**7,060,450**	**0.092%**	**3,388**	**726,729**	**0.092%**	**349**
Liquefaction							**6,631,400**	**6.29%**	**35,792**	**0**	**0**	**0**
Direct Facility Emissions (includes Peak Shaving)	*6,818,200*		*34,483*	*0*		*0*	*6,631,406*	*0.00%*	*33,539*	*0*	*0*	*0*
Electricity Supply	*6,818,200*		*2,312*	*0*		*0*	*6,631,406*	*0.00%*	*2,253*	*0*	*0*	*0*
Vessel Loading of LNG							**5,904,671**	**0**	**14,100**	**0**	**0**	**0**
TOTE	*2,914,080*	*0.011%*	*174*	*0*		*0*	*2,834,242*	*0.011%*	*169*	*0*	*0*	*0*
Bunker Barge	*3,156,920*	*0.837%*	*14,323*	*0*		*0*	*3,070,429*	*0.814%*	*13,930*	*0*	*0*	*0*
Truck-to-Vessel	*0*	*0.220%*	*0*	*0*		*0*	*0*	*0.214%*	*0*	*0*	*0*	*0*
On-road Heavy-duty Truck Fuel							**0**	**0**	**0**	**0**	**0**	**0**
LNG (Plant-to-Tank Emissions)	*0*	*0.47%*	*0*	*0*		*0*	*0*	*0.46%*	*0*	*0*	*0*	*0*
LNG (Tank-to-Wheels Emissions)	*0*		*0*	*0*		*0*	*0*	*0.00%*	*0*	*0*	*0*	*0*
ULSD (Well-to-Wheels Emissions)	*0*		*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTE Vessel Operations							**2,918,948**	**0**	**228,907**	**5,837,897**	**0**	**330,827**
TOTE LNG (Direct Vessel Emissions)	*2,913,759*		*233,733*	*0*		*0*	*2,833,930*	*0*	*227,330*	*0*	*0*	*0*
TOTE Pilot Fuel Oil (Well-to-Tank Emissions)	*87,413*		*1,622*	*0*		*0*	*85,018*	*0*	*1,577*	*0*	*0*	*0*
TOTE Fuel Oil (Well-to-Tank Emissions)	*0*		*0*	*3,001,172*		*55,680*	*0*	*0*	*0*	*2,918,948*	*0*	*54,154*
TOTE Fuel Oil (Direct Vessel Emissions)	*0*		*0*	*3,001,172*		*284,466*	*0*	*0*	*0*	*2,918,948*	*0*	*276,672*
Other Vessel Operations							**3,136,086**	**0**	**245,935**	**3,136,086**	**0**	**355,437**
Other LNG (Direct Vessel Emissions)	*3,130,511*		*251,121*	*0*		*0*	*3,044,744*	*0*	*244,241*	*0*	*0*	*0*
Other Pilot Fuel Oil (Well-to-Tank Emissions)	*93,915*		*1,742*	*0*		*0*	*91,342*	*0*	*1,695*	*0*	*0*	*0*
Other Fuel Oil (Well-to-Tank Emissions)	*0*		*0*	*3,224,427*		*59,822*	*0*	*0*	*0*	*3,136,086*	*0*	*58,183*
Other Fuel Oil (Direct Vessel Emissions)	*0*		*0*	*3,224,427*		*305,625*	*0*	*0*	*0*	*3,136,086*	*0*	*297,254*
Total			**608,449**			**712,698**	**0**	**0**	**591,780**	**0**	**0**	**693,164**

Summary of Terminal Construction Emissions - GHG PSE LNG

Equipment (Direct + Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne / year)
1. Year - Construction Equipment	1,807	0.1	0.01	1,814
1. Year - Road Vehicles/Commuting	3	0.0	0.00	3
1. Year - Fugitive Dust				0
1. Year - Total Emissions	1,811	0.1	0.01	1,817
2. Year - Construction Equipment	3,638	0.3	0.03	3,654
2. Year - Road Vehicles/Commuting	298	0.0	0.00	298
2. Year - Fugitive Dust				0
2. Year - Total Emissions	3,936	0.3	0.03	3,953
3. Year - Construction Equipment	2,838	0.2	0.03	2,852
3. Year - Road Vehicles/Commuting	404	0.0	0.00	405
3. Year - Fugitive Dust				0
3. Year - Total Emissions	3,242	0.2	0.03	3,257
4. Year - Construction Equipment	1,655	0.1	0.02	1,664
4. Year - Road Vehicles/Commuting	2	0.0	0.00	2
4. Year - Fugitive Dust				0
4. Year - Total Emissions	1,657	0.1	0.02	1,666
Project TOTAL:	**10,646**	**0.8**	**0.09**	**10,692**

Equipment (Direct)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne / year)
1. Year - Construction Equipment	1,703	0.018	0.012	1,707
1. Year - Road Vehicles/Commuting	3	0.000	0.000	3
1. Year - Fugitive Dust				0
1. Year - Total Emissions	1,706	0.018	0.012	1,710
2. Year - Construction Equipment	3,417	0.049	0.030	3,427
2. Year - Road Vehicles/Commuting	227	0.002	0.001	227
2. Year - Fugitive Dust				0
2. Year - Total Emissions	3,643	0.051	0.030	3,654
3. Year - Construction Equipment	62	0.023	0.014	67
3. Year - Road Vehicles/Commuting	307	0.003	0.001	308
3. Year - Fugitive Dust				0
3. Year - Total Emissions	369	0.026	0.015	374
4. Year - Construction Equipment	1,545	0.028	0.017	1,550
4. Year - Road Vehicles/Commuting	2	0.000	0.000	2
4. Year - Fugitive Dust				0
4. Year - Total Emissions	1,546	0.028	0.017	1,552
Project TOTAL:	**7,265**	**0.123**	**0.074**	**7,289**

Equipment (Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne / year)
1. Year - Construction Equipment	104	0.1	0.00	107
1. Year - Road Vehicles/Commuting	1	0.0	0.00	1
1. Year - Fugitive Dust				0
1. Year - Total Emissions	105	0.1	0.00	108
2. Year - Construction Equipment	221	0.2	0.00	228
2. Year - Road Vehicles/Commuting	72	0.0	0.00	72
2. Year - Fugitive Dust				0
2. Year - Total Emissions	293	0.2	0.00	299
3. Year - Construction Equipment	189	0.2	0.00	195
3. Year - Road Vehicles/Commuting	97	0.0	0.00	97
3. Year - Fugitive Dust				0
3. Year - Total Emissions	286	0.2	0.00	292
4. Year - Construction Equipment	110	0.1	0.00	113
4. Year - Road Vehicles/Commuting	0	0.0	0.00	0
4. Year - Fugitive Dust				0
4. Year - Total Emissions	111	0.1	0.00	114
Project TOTAL:	**795**	**0.6**	**0.00**	**812**

Operation hours per month	205.44

Construction Emission during 1. Year

																	Upstream Emission Diesel production				Total
Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2e Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)	Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
Upland Construction (demo, soil, utilities)																					
Cat 345 Backhoe 4 cy	1	6	165	78%	21%	0.52	2.600	0.664	624	630	0.740	0.450	20	0.0004	0.0002	20.3	82	1.7156	0.0017	0.00001	1.7624	22.0
100 Ton Crawler Crane	1	6	250	89%	43%	0.17	0.491	0.188	530	531	0.740	0.450	60	0.0001	0.0001	59.9	28	0.5763	0.0006	0.00000	0.5920	60.5
200 Ton Crawler Crane	1	6	300	89%	43%	0.17	0.491	0.188	530	531	0.740	0.450	72	0.0001	0.0001	71.8	28	0.5763	0.0006	0.00000	0.5920	72.4
22 Ton Hydrocrane	1	6	85	89%	43%	0.42	1.733	0.285	590	594	0.740	0.450	23	0.0003	0.0002	22.8	67	1.3976	0.0014	0.00001	1.4358	24.2
30 Ton Hydrocrane	1	6	100	89%	43%	0.42	1.733	0.255	590	594	0.740	0.450	27	0.0003	0.0002	26.8	67	1.3976	0.0014	0.00001	1.4358	28.2
Air Compressor	2	6	55	100%	43%	1.02	1.090	0.227	590	592	0.740	0.450	35	0.0019	0.0011	34.9	323	6.7564	0.0068	0.00005	6.9407	41.9
Cat Compactor	2	6	65	89%	59%	0.73	2.600	0.664	595	601	0.740	0.450	48	0.0011	0.0007	48.5	232	4.8487	0.0049	0.00003	4.9810	53.5
Cat D6 Dozer	2	6	65	89%	59%	0.49	2.663	0.309	595	600	0.740	0.450	48	0.0008	0.0005	48.4	155	3.2391	0.0033	0.00002	3.3275	51.7
Crew Truck, 3/4 ton	2	6	250	89%	59%	0.07	2.080	0.216	536	540	0.740	0.450	167	0.0001	0.0001	166.9	23	0.4902	0.0005	0.00000	0.5035	167.4
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.274	0.141	536	537	0.740	0.450	167	0.0001	0.0001	166.9	23	0.4902	0.0005	0.00000	0.5035	167.4
Flatbed Truck (Matl. Handling)	1	6	200	89%	59%	0.11	0.519	0.150	536	537	0.740	0.450	66	0.0001	0.0001	66.4	18	0.3709	0.0004	0.00000	0.3811	66.8
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.535	0.284	595	600	0.740	0.450	19	0.0003	0.0002	18.6	103	2.1627	0.0022	0.00001	2.2217	20.8
Fuel Truck	2	6	200	89%	59%	0.11	0.519	0.150	536	537	0.740	0.450	133	0.0002	0.0001	132.9	35	0.7419	0.0007	0.00001	0.7621	133.7
Loader, Cat 966, 4 cy	2	6	100	89%	21%	0.65	5.700	0.924	693	705	0.740	0.450	31	0.0010	0.0006	31.2	205	4.2790	0.0043	0.00003	4.3958	35.6
Manlifts	1	6	50	89%	21%	3.66	6.316	1.643	691	706	0.740	0.450	8	0.0028	0.0017	8.4	580	12.1250	0.0122	0.00008	12.4559	20.8
In-water Construction																						
Forklift, 8,000 lbs	2	6	65	78%	59%	0.65	2.535	0.294	595	600	0.740	0.450	43	0.0009	0.0005	42.7	207	4.3254	0.0044	0.00003	4.4434	47.2
Air Compressor	4	6	55	100%	43%	1.02	1.090	0.181	590	592	0.740	0.450	69	0.0037	0.0023	69.8	646	13.5127	0.0136	0.00009	13.8814	83.7
Crane, 60 ton	3	6	290	89%	43%	0.17	0.491	0.098	530	531	0.740	0.450	208	0.0004	0.0002	208.2	83	1.7288	0.0017	0.00001	1.7760	210.0
Crew Truck, 3/4 ton	3	6	250	28%	59%	0.07	2.090	0.219	536	540	0.740	0.450	74	0.0001	0.0000	73.6	35	0.7353	0.0007	0.00001	0.7553	74.4
Diesel Pile Driver Hammer	3	6	85	89%	59%	0.73	2.663	0.327	595	600	0.740	0.450	95	0.0017	0.0010	95.0	348	7.2730	0.0073	0.00005	7.4715	102.4
Flatbed Truck (Matl. Handling)	3	6	200	89%	59%	0.11	0.519	0.121	536	537	0.740	0.450	199	0.0003	0.0002	199.3	53	1.1128	0.0011	0.00001	1.1432	200.4
Fuel Truck	2	6	200	28%	59%	0.11	0.519	0.121	536	537	0.740	0.450	39	0.0001	0.0000	39.1	35	0.7419	0.0007	0.00001	0.7621	39.8
Loader, Cat 966, 4 cy	2	6	100	78%	21%	0.65	5.700	0.832	693	705	0.740	0.450	27	0.0009	0.0005	27.5	205	4.2790	0.0043	0.00003	4.3958	31.9
Personnel Work Boat	1	4.99	30	78%	45%	3.90	3.728	0.298	515	521	0.020	0.080	5	0.0001	0.0003	5.5	513	10.7362	0.0108	0.00007	11.0291	16.5
Tug/Work Barge w/crane	1	1.04	500	89%	45%	31.80	3.728	0.224	515	521	0.020	0.080	21	0.0001	0.0005	21.5	876	18.3325	0.0185	0.00013	18.8328	40.4
												Annual Tot	1,703	0.0178	0.0115	1,707.1	4969	103.9	0.1	0.0	106.8	1,813.8

Construction Emission during 2. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO_2c (tonne/year)	CH4 (tonne/year)	N2O (tonne/year)	CO2e use (tonne/year)	Fuel consumption (mmBtu/year)	Upstream CO_2 (tonne/year)	Upstream CH_4 (tonne/year)	Upstream N2O (tonne/year)	Upstream CO2e (tonne/year)	Total CO2e (tonne/year)
Upland Construction (demo, soil, utilities)																						
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.330	0.606	625	631	0.740	0.450	20.2	0.0004	0.0002	20.3	82	1.7222	0.0017	0.00001	1.7692	22.0
100 Ton Crawler Crane	1	6	250	89%	43%	0.17	0.429	0.175	530	531	0.740	0.450	59.8	0.0001	0.0001	59.9	27	0.5630	0.0006	0.00000	0.5784	60.4
200 Ton Crawler Crane	1	6	300	89%	43%	0.17	0.429	0.175	530	531	0.740	0.450	71.8	0.0001	0.0001	71.8	27	0.5630	0.0006	0.00000	0.5784	72.4
22 Ton Hydrocrane	1	6	85	89%	43%	0.42	1.542	0.230	590	593	0.740	0.450	22.7	0.0003	0.0002	22.8	66	1.3910	0.0014	0.00001	1.4290	24.2
30 Ton Hydrocrane	1	6	100	89%	43%	0.42	1.542	0.230	590	593	0.740	0.450	26.7	0.0003	0.0002	26.8	66	1.3910	0.0014	0.00001	1.4290	28.2
Air Compressor	2	6	55	100%	43%	1.02	0.908	0.207	590	592	0.740	0.450	34.5	0.0019	0.0011	34.9	323	6.7564	0.0068	0.00005	6.9407	41.8
Cat Compactor	2	6	65	89%	59%	0.73	2.408	0.280	595	600	0.740	0.450	48.2	0.0011	0.0007	48.4	231	4.8354	0.0049	0.00003	4.9674	53.4
Cat D6 Dozer	2	6	65	89%	59%	0.49	1.769	0.192	596	599	0.740	0.450	48.2	0.0008	0.0005	48.3	155	3.2457	0.0033	0.00002	3.3343	51.7
Crew Truck, 3/4 ton	2	6	250	89%	59%	0.07	0.203	0.137	536	537	0.740	0.450	165.9	0.0001	0.0001	165.9	22	0.4637	0.0005	0.00000	0.4763	166.4
Dump Trucks 15 cy	2	6	285	79%	59%	0.07	0.203	0.137	536	537	0.740	0.450	166.9	0.0001	0.0001	166.9	22	0.4637	0.0005	0.00000	0.4763	167.4
Flatbed Truck (Matl. Handling)	1	6	200	89%	59%	0.11	0.322	0.141	536	537	0.740	0.450	66.4	0.0001	0.0001	66.4	17	0.3643	0.0004	0.00000	0.3743	66.8
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.265	0.257	595	599	0.740	0.450	18.5	0.0003	0.0002	18.6	103	2.1528	0.0022	0.00001	2.2115	20.8
Fuel Truck	2	6	200	89%	59%	0.11	0.322	0.141	536	537	0.740	0.450	132.8	0.0002	0.0001	132.8	35	0.7286	0.0007	0.00001	0.7485	133.6
Loader, Cat 966, 4 cy	2	6	300	89%	21%	0.65	5.288	0.839	693	704	0.740	0.450	31.0	0.0010	0.0006	31.2	206	4.2055	0.0043	0.00003	4.4220	35.6
Manlifts	1	6	50	89%	21%	3.66	5.873	1.516	691	705	0.740	0.450	7.8	0.0028	0.0017	8.3	579	12.1217	0.0122	0.00008	12.4525	20.8
In-water Construction																						
Forklift, 8,000 lbs	2	1	65	78%	59%	0.65	2.265	0.257	595	599	0.740	0.450	7.1	0.0001	0.0001	7.1	34	0.7176	0.0007	0.00000	0.7372	7.9
Air Compressor	4	1	55	100%	43%	1.02	0.908	0.207	590	592	0.740	0.450	11.5	0.0006	0.0004	11.6	108	2.2521	0.0023	0.00002	2.3136	13.9
Crane, 60 ton	3	1	290	89%	43%	0.17	0.429	0.175	530	531	0.740	0.450	34.7	0.0001	0.0000	34.7	13	0.2815	0.0003	0.00000	0.2892	35.0
Crew Truck, 3/4 ton	3	1	250	29%	59%	0.07	0.203	0.137	536	537	0.740	0.450	12.2	0.0000	0.0000	12.2	6	0.1159	0.0001	0.00000	0.1191	12.3
Diesel Pile Driver Hammer	3	1	85	89%	59%	0.73	2.408	0.280	595	600	0.740	0.450	15.8	0.0003	0.0002	15.8	58	1.2089	0.0012	0.00001	1.2418	17.1
Flatbed Truck (Matl. Handling)	3	1	200	89%	59%	0.11	0.322	0.141	536	537	0.740	0.450	33.2	0.0000	0.0000	33.2	9	0.1822	0.0002	0.00000	0.1871	33.4
Fuel Truck	2	1	200	29%	59%	0.11	0.322	0.141	536	537	0.740	0.450	6.5	0.0000	0.0000	6.5	6	0.1214	0.0001	0.00000	0.1248	6.6
Loader, Cat 966, 4 cy	2	1	300	79%	21%	0.65	5.288	0.839	693	704	0.740	0.450	4.6	0.0001	0.0001	4.6	34	0.7176	0.0007	0.00000	0.7372	5.3
Personnel Work Boat	1	1	30	79%	45%	3.90	3.728	0.224	515	521	0.020	0.090	1.1	0.0000	0.0001	1.1	103	2.1528	0.0022	0.00001	2.2115	3.3
Tug/Work Barge w/crane	1	1	250	89%	45%	15.90	3.728	0.224	515	521	0.020	0.090	10.2	0.0001	0.0002	10.3	420	8.7767	0.0089	0.00006	9.0161	19.3
LNG Facility Construction (including Storage Tank)																						
Cat 345 Backhoe 4 cy	1	7	165	89%	21%	0.52	2.330	0.606	625	631	0.740	0.450	26.7	0.0005	0.0003	26.8	96	2.0092	0.0020	0.00001	2.0641	28.9
100 Ton Crawler Crane	2	7	250	89%	43%	0.17	0.429	0.175	530	531	0.740	0.450	139.6	0.0003	0.0002	139.7	63	1.3137	0.0013	0.00001	1.3496	141.0
200 Ton Crawler Crane	3	7	300	89%	43%	0.17	0.429	0.175	530	531	0.740	0.450	251.3	0.0005	0.0003	251.4	94	1.9706	0.0020	0.00001	2.0244	253.4
22 Ton Hydrocrane	4	7	85	89%	43%	0.42	1.542	0.230	590	593	0.740	0.450	106.0	0.0015	0.0009	106.3	310	6.4914	0.0066	0.00004	6.6685	113.0
30 Ton Hydrocrane	3	7	100	89%	43%	0.42	1.542	0.230	590	593	0.740	0.450	93.5	0.0011	0.0007	93.8	233	4.8686	0.0049	0.00003	5.0014	98.8
Air Compressor	4	7	55	89%	43%	1.02	0.908	0.207	590	592	0.740	0.450	68.5	0.0037	0.0022	69.2	754	15.7649	0.0159	0.00011	16.1950	85.4
Cat Compactor	3	7	65	89%	59%	0.73	2.408	0.280	595	600	0.740	0.450	84.3	0.0020	0.0012	84.7	405	8.4620	0.0085	0.00006	8.6929	93.4
Cat D6 Dozer	3	7	65	89%	59%	0.49	1.769	0.192	596	599	0.740	0.450	84.3	0.0013	0.0008	84.6	272	5.6800	0.0057	0.00004	5.8350	90.4
Concrete Pump	3	7	150	85%	43%	1.06	2.355	0.473	589	594	0.74	0.450	140.5	0.0029	0.0017	141.1	587	12.2873	0.0124	0.00008	12.6226	153.8
Crane, 60 ton	1	7	290	50%	43%	0.17	0.429	0.175	530	531	0.740	0.450	47.6	0.0001	0.0001	47.7	31	0.6569	0.0007	0.00000	0.6748	48.3
Crew Truck, 3/4 ton	6	7	250	89%	59%	0.07	0.203	0.137	536	537	0.740	0.450	580.6	0.0004	0.0002	580.7	76	1.6229	0.0016	0.00001	1.6671	582.4
Dump Trucks 15 cy	1	7	285	79%	59%	0.07	0.203	0.137	536	537	0.740	0.450	97.3	0.0001	0.0000	97.4	13	0.2705	0.0003	0.00000	0.2779	97.6
Flatbed Truck (Matl. Handling)	3	7	200	89%	59%	0.11	0.322	0.141	536	537	0.740	0.450	232.3	0.0003	0.0002	232.4	61	1.2751	0.0013	0.00001	1.3099	233.7
Forklift, 8,000 lbs	3	7	85	50%	59%	0.65	2.265	0.257	595	599	0.740	0.450	64.8	0.0010	0.0006	65.1	360	7.5347	0.0076	0.00005	7.7403	72.8
Fuel Truck	3	7	200	89%	59%	0.11	0.322	0.141	536	537	0.740	0.450	232.3	0.0003	0.0002	232.4	61	1.2751	0.0013	0.00001	1.3099	233.7
Loader, Cat 966, 4 cy	3	7	100	89%	21%	0.65	5.288	0.839	693	704	0.740	0.450	54.2	0.0018	0.0011	54.6	360	7.5347	0.0076	0.00005	7.7403	62.3
Manlifts	6	7	50	89%	21%	3.66	5.873	1.516	691	705	0.740	0.450	54.3	0.0199	0.0121	58.4	4,056	84.8520	0.0856	0.00058	87.1673	145.6
												Annual Tot	3,417	0.0486	0.0298	3427	10587.4376	221.4642	0.2235	0.0015	227.5070	3,654

Construction Emission during 3. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/year)	CH4 (tonne/year)	N2O (tonne/year)	CO2e use (tonne/year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/year)	Upstream CH4 (tonne/year)	Upstream N2O (tonne/year)	Upstream CO2e (tonne/year)	Total CO2e (tonne/year)
LNG Facility Construction (no Storage Tank Construction)																						
100 Ton Crawler Crane	2	12	250	89%	43%	0.17	0.371	0.166	531	532	0.740	0.450	240	0.0005	0.0003	239.8	130	2.3051	0.0223	0.00002	2.3680	242.2
200 Ton Crawler Crane	2	12	300	89%	43%	0.17	0.371	0.166	531	532	0.740	0.450	288	0.0005	0.0003	287.8	130	2.3051	0.0223	0.00002	2.3680	290.2
22 Ton Hydrocrane	3	12	85	89%	43%	0.42	1.359	0.208	590	593	0.740	0.450	136	0.0020	0.0012	136.6	401	8.3858	0.0085	0.00006	8.6147	145.2
30 Ton Hydrocrane	2	12	100	89%	43%	0.42	1.359	0.208	590	593	0.740	0.450	107	0.0013	0.0008	107.1	267	5.5906	0.0056	0.00004	5.7431	112.8
Air Compressor	3	12	55	89%	43%	1.02	0.734	0.189	590	592	0.740	0.450	88	0.0047	0.0029	89.0	989	20.2691	0.0205	0.00014	20.8222	109.8
Cat Compactor	2	12	65	89%	59%	0.73	2.163	0.254	595	599	0.740	0.450	96	0.0023	0.0014	96.8	464	9.6974	0.0098	0.00007	9.9620	106.7
Cat D6 Dozer	2	12	65	89%	59%	0.49	1.503	0.177	596	599	0.740	0.450	96	0.0015	0.0009	96.6	310	6.4782	0.0065	0.00004	6.6549	103.2
Concrete Pump	2	12	150	89%	43%	1.06	2.214	0.445	589	594	0.740	0.450	161	0.0033	0.0020	161.2	670	14.0161	0.0141	0.00010	14.3986	175.6
Crane, 60 ton	1	12	290	50%	43%	0.17	0.371	0.166	531	532	0.740	0.450	82	0.0002	0.0001	81.8	55	1.1526	0.0012	0.00001	1.1840	83.0
Crew Truck, 3/4 ton	4	12	250	89%	59%	0.07	0.163	0.135	536	537	0.740	0.450	664	0.0005	0.0003	663.6	94	1.9607	0.0020	0.00001	2.0142	665.6
Flatbed Truck (Matl. Handling)	2	12	200	89%	59%	0.11	0.239	0.137	536	537	0.740	0.450	265	0.0003	0.0002	265.5	71	1.4838	0.0015	0.00001	1.5242	267.1
Forklift, 8,000 lbs	2	12	85	21%	59%	0.65	2.007	0.233	595	599	0.740	0.450	37	0.0005	0.0004	37.1	414	8.6508	0.0087	0.00005	8.8868	46.0
Fuel Truck	2	12	200	89%	59%	0.11	0.239	0.137	536	537	0.740	0.450	265	0.0003	0.0002	265.5	71	1.4838	0.0015	0.00001	1.5242	267.1
Loader, Cat 966, 4 cy	2	12	100	89%	21%	0.65	4.895	0.759	694	704	0.740	0.450	62	0.0020	0.0012	62.4	409	8.5581	0.0086	0.00006	8.7916	71.2
Manlifts	4	12	50	89%	21%	3.66	5.441	1.398	692	705	0.740	0.450	62	0.0227	0.0138	66.7	4,637	97.0002	0.0979	0.00067	99.6470	166.4
												Annual Tot	2,649	0.0428	0.0260	2,658	9,052	189	0	0	195	2,852

Construction Emission during 4. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/year)	CH4 (tonne/year)	N2O (tonne/year)	CO2e use (tonne/year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/year)	Upstream CH4 (tonne/year)	Upstream N2O (tonne/year)	Upstream CO2e (tonne/year)	Total CO2e (tonne/year)
LNG Facility Construction (no Storage Tank Construction)																						
100 Ton Crawler Crane	2	7	250	89%	43%	0.17	0.317	0.159	531	532	0.740	0.450	140	0.0004	0.0002	139.9	64	1.3446	0.0014	0.00001	1.3813	141.3
200 Ton Crawler Crane	2	7	300	89%	43%	0.17	0.317	0.159	531	532	0.740	0.450	168	0.0004	0.0002	167.8	64	1.3446	0.0014	0.00001	1.3813	169.2
22 Ton Hydrocrane	3	7	85	89%	43%	0.42	1.183	0.188	590	592	0.740	0.450	79	0.0013	0.0008	79.7	234	4.8917	0.0049	0.00003	5.0252	84.7
30 Ton Hydrocrane	2	7	100	89%	43%	0.42	1.183	0.188	590	592	0.740	0.450	62	0.0008	0.0005	62.5	156	3.2612	0.0033	0.00002	3.3501	65.8
Air Compressor	3	7	55	89%	43%	1.02	0.572	0.172	590	591	0.740	0.450	51	0.0031	0.0019	51.9	565	11.8236	0.0119	0.00008	12.1463	64.1
Cat Compactor	2	7	65	89%	59%	0.73	1.930	0.232	595	599	0.740	0.450	56	0.0015	0.0009	56.4	270	5.6568	0.0057	0.00004	5.8112	62.3
Cat D6 Dozer	2	7	65	89%	59%	0.49	1.257	0.164	596	598	0.740	0.450	56	0.0010	0.0006	56.3	181	3.7789	0.0038	0.00003	3.8820	60.2
Concrete Pump	2	7	150	89%	43%	1.06	2.078	0.417	589	594	0.740	0.450	94	0.0021	0.0013	94.0	391	8.1761	0.0083	0.00006	8.3992	102.4
Crane, 60 ton	1	7	290	50%	43%	0.17	0.317	0.159	531	532	0.740	0.450	48	0.0001	0.0001	47.7	32	0.6723	0.0007	0.00000	0.6907	48.4
Crew Truck, 3/4 ton	4	7	250	89%	59%	0.07	0.139	0.133	536	537	0.740	0.450	387	0.0003	0.0002	387.1	55	1.1437	0.0012	0.00001	1.1749	388.3
Flatbed Truck (Matl. Handling)	2	7	200	89%	59%	0.11	0.192	0.134	536	537	0.740	0.450	155	0.0002	0.0001	154.9	41	0.8655	0.0009	0.00001	0.8891	155.8
Forklift, 8,000 lbs	2	7	85	21%	59%	0.65	1.762	0.211	595	598	0.740	0.450	22	0.0004	0.0002	21.7	241	5.0463	0.0051	0.00003	5.1840	26.8
Fuel Truck	2	7	200	89%	59%	0.11	0.192	0.134	536	537	0.740	0.450	155	0.0002	0.0001	154.9	41	0.8655	0.0009	0.00001	0.8891	155.8
Loader, Cat 966, 4 cy	2	7	100	89%	21%	0.65	4.557	0.694	694	703	0.740	0.450	36	0.0013	0.0008	36.4	239	4.9922	0.0050	0.00003	5.1284	41.5
Manlifts	4	7	50	89%	21%	3.66	5.021	1.273	692	704	0.740	0.450	36	0.0350	0.0089	39.2	2,705	56.5835	0.0571	0.00039	58.1274	97.3
												Annual Tot	1,545	0.0280	0.0168	1,550	5,280	110	0	0	113	1,664

Notes:
- Assume 48 hours per week; 4.28 weeks per month 205 hrs/month
- Emission factors for CO, VOC, and CO2 are average NONROAD emission rates for the State of Washington.
- Emission factors for CH4 and N2O are from the Climate Registry 2014 Default Emission Factors, Table 13.7.
- Tugboat, Workboat, and Personnel Boat Emissions factors from U.S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report April 2009, Table 3-8: Harbor Craft Emission Factors (g/kWh)

Road Vehicle Terminal Construction Criteria Pollutant Emissions
PSE LNG

Construction Vehicle Emissions - Winter 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	311.0	0.0	0.0	2.83	0.0	316	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		38	1942.0	0.0	0.0	3.11	0.5	1,949	0.074	0.000	0.000	0.07	0.949	0.02300	0.00000	0.00000	0.02300	0.09710
								Total	0.074	0.000	0.000	0.074	0.949	0.023	0.000	0.000	0.023	0.097

Construction Vehicle Emissions - Summer 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	325.2	0.0	0.0	1.83	0.0	328	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		1,225	2017.0	0.0	0.0	3.11	0.5	2,024	2.5	0.000	0.000	2.48	31.756	0.77011	0.00000	0.00000	0.77011	3.25051
								Total	2.5	0.000	0.000	2.48	31.756	0.770	0.000	0.000	0.770	3.251
								Annual Total	**2.6**	**0.0**	**0.0**	**2.6**	**32.7**	**0.8**	**0.0**	**0.0**	**0.8**	**3.3**

Construction Vehicle Emissions - Winter 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers	Seattle-Tacoma	309,120	306.0	0.0	0.0	2.68	0.0	310	95.9	0.001	0.000	96.03	1250.964	30.33651	0.00000	0.00000	30.33651	126.37105
Heavy Duty Delivery Trucks		9,999	1942.0	0.0	0.0	2.80	0.3	1,948	19.5	0.000	0.000	19.49	249.548	6.05165	0.00000	0.00000	6.05165	25.54304
								Total	115.4	0.001	0.000	115.53	1500.512	36.388	0.000	0.000	36.388	151.914

Construction Vehicle Emissions - Summer 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	309,120	319.3	0.0	0.0	1.70	0.0	322	99.6	0.001	0.000	99.68	1298.405	31.48698	0.00000	0.00000	31.48698	131.16349
Heavy Duty Delivery Trucks		5,789	2018.0	0.0	0.0	2.86	0.3	2,024	11.7	0.000	0.000	11.72	150.110	3.64025	0.00000	0.00000	3.64025	15.36491
								Total	111.3	0.001	0.000	111.40	1448.515	35.127	0.000	0.000	35.127	146.528
								Annual Total	**226.7**	**0.0**	**0.0**	**226.9**	**2949.0**	**71.5**	**0.0**	**0.0**	**71.5**	**298.4**

Construction Vehicle Emissions - Winter 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	302,400	300.0	0.0	0.0	2.56	0.0	304	92.0	0.001	0.000	92.07	1199.349	29.08492	0.00000	0.00000	29.08492	121.15696
Heavy Duty Delivery Trucks		6,356	1942.0	0.0	0.0	2.62	0.4	1,947	12.4	0.000	0.000	12.39	158.591	3.84592	0.00000	0.00000	3.84592	16.23300
								Total	104.3	0.001	0.000	104.46	1357.940	32.931	0.000	0.000	32.931	137.390

Construction Vehicle Emissions - Summer 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	614,880	313.8	0.0	0.0	1.59	0.0	316	194.5	0.002	0.001	194.76	2536.972	61.52286	0.00000	0.00000	61.52286	256.28219
Heavy Duty Delivery Trucks		4,160	2018.0	0.0	0.0	2.62	0.4	2,023	8.4	0.000	0.000	8.42	107.846	2.61531	0.00000	0.00000	2.61531	11.03881
								Total	202.9	0.002	0.001	203.18	2644.818	64.138	0.000	0.000	64.138	267.321
								Annual Total	**307.3**	**0.0**	**0.0**	**307.6**	**4002.8**	**97.1**	**0.0**	**0.0**	**97.1**	**404.7**

Construction Vehicle Emissions - Winter 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	295.0	0.0	0.0	2.46	0.0	299	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucki		457	1942.0	0.0	0.0	2.38	0.4	1,947	0.9	0.000	0.000	0.89	11.400	0.27646	0.00000	0.00000	0.27646	1.16689
								Total	0.9	0.000	0.000	0.89	11.400	0.276	0.000	0.000	0.276	1.167

Construction Vehicle Emissions - Summer 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	308.5	0.0	0.0	1.51	0.0	311	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucki		306	2019.0	0.0	0.0	2.38	0.4	2,024	0.6	0.000	0.000	0.62	7.935	0.19243	0.00000	0.00000	0.19243	0.81221
								Total	0.6	0.000	0.000	0.62	7.935	0.192	0.000	0.000	0.192	0.812
								Annual Total	**1.5**	**0.0**	**0.0**	**1.5**	**19.3**	**0.5**	**0.0**	**0.0**	**0.5**	**2.0**

Notes:
EFs from EPA MOVES model.
Construction Worker vehicles assumed to be ID 21 - Passenger Car. Heavy-Duty Delivery trucks assumed to be 61 - Combination Short-haul truck.
Assume 48 hours per week; 4.28 weeks per month

Month/Year	Season	# of work days/ month	# of Cars/day	# of cars/ month	Car VMT/ month	# of Trucks/ month	Truck VMT/ month	Total On-Site VMT/ month (Car and Truck)
Jan-1. Year		26.6	0	0	0	0.00	0	0
Feb-1. Year	Winter 1. Year	24	0	0	0	0.00	0	0
Mar-1. Year		26.6	0	0	0	0.00	0	0
Apr-1. Year		25.7	0	0	0	0.00	0	0
May-1. Year		26.6	0	0	0	0.00	0	0
Jun-1. Year		25.7	0	0	0	85.00	331	331
Jul-1. Year	Summer 1. Year	26.6	0	0	0	85.00	320	320
Aug-1. Year		26.6	0	0	0	75.00	282	282
Sep-1. Year		25.7	0	0	0	75.00	292	292
Oct-1. Year		26.6	0	0	0	5.00	19	19
Nov-1. Year	Winter 1. Year	25.7	0	0	0	5.00	19	19
Dec-1. Year		26.6	0	0	0	0.00	0	0
Jan-2. Year		26.6	0	0	0	0.00	0	0
Feb-2. Year	Winter 2. Year	24.9	0	0	0	0.00	0	0
Mar-2. Year		26.6	0	0	0	0.00	0	0
Apr-2. Year		25.7	0	0	0	0.00	0	0
May-2. Year		26.6	0	0	0	0.00	0	0
Jun-2. Year		25.7	0	0	0	174.00	677	677
Jul-2. Year	Summer 2. Year	26.6	98	2,604	104,160	244.00	918	105,078
Aug-2. Year		26.6	98	2,604	104,160	294.00	1,106	105,266
Sep-2. Year		25.7	98	2,520	100,800	794.00	3,088	103,888
Oct-2. Year		26.6	98	2,604	104,160	844.00	3,176	107,336
Nov-2. Year	Winter 2. Year	25.7	98	2,520	100,800	894.00	3,477	104,277
Dec-2. Year		26.6	98	2,604	104,160	889.00	3,346	107,506
Jan-3. Year		26.6	98	2,604	104,160	888.00	3,342	107,502
Feb-3. Year	Winter 3. Year	24	98	2,352	94,080	329.00	1,371	95,451
Mar-3. Year		26.6	98	2,604	104,160	279.00	1,050	105,210
Apr-3. Year		25.7	98	2,520	100,800	279.00	1,085	101,885
May-3. Year		26.6	98	2,604	104,160	252.00	948	105,108
Jun-3. Year		25.7	98	2,520	100,800	189.00	735	101,535
Jul-3. Year	Summer 3. Year	26.6	98	2,604	104,160	139.00	523	104,683
Aug-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Sep-3. Year		25.7	98	2,520	100,800	89.00	346	101,146
Oct-3. Year		26.6	0	0	0	78.00	294	294
Nov-3. Year	Winter 3. Year	25.7	0	0	0	39.00	152	152
Dec-3. Year		26.6	0	0	0	39.00	147	147
Jan-4. Year		26.6	0	0	0	39.00	147	147
Feb-4. Year	Winter 4. Year	24	0	0	0	39.00	163	163
Mar-4. Year		26.6	0	0	0	39.00	147	147
Apr-4. Year		25.7	0	0	0	41.00	159	159
May-4. Year		26.6	0	0	0	39.00	147	147
Jun-4. Year		25.7	0	0	0	0.00	0	0
Jul-4. Year	Summer 4. Year	26.6	0	0	0	0.00	0	0
Aug-4. Year		26.6	0	0	0	0.00	0	0
Sep-4. Year		25.7	0	0	0	0.00	0	0
Oct-4. Year		26.6	0	0	0	0.00	0	0
Nov-4. Year	Winter 4. Year	25.7	0	0	0	0.00	0	0
Dec-4. Year		26.6	0	0	0	0.00	0	0
Total				1,535,520		28,330		

Note: Commute round-trip distance was assumed

Cars VMT round trip	40	mi/day
Truck VMT round trip	100	mi/day

Summary VMTs		Car VMT/ month	Truck VMT/ month
1.Year	Winter	0	38.00
	Summer	0	1225.00
2.Year	Winter	309,120	9999.00
	Summer	309,120	5789.00
3.Year	Winter	302,400	6356.00
	Summer	614,880	4160.00
4.Year	Winter	0	457.00
	Summer	0	306.00
Total		**1,535,520**	**28330.00**

Construction Material & Power- UPSTREAM Emissions -

Input	tonnes	Source
Steel	4,745	Response Tacoma LNG Supplementary SEIS Questions, July 07, 2018, page 5
Rebar	1666.0	
Stainless Steel	290.0	
Copper	26	
Asphalt	7570.0	
Paint	5.0	
Aggregate	80110.0	
Cement	1716.0	

Pollutant	CO_2	CH_4	N_2O	CO_2e	Source
Life Cycle Emission Factor (g/kg)					
Structural Steel	2,687	4.3	0.0	2,802	GREET2_2017
Rebar	2,020	3.5	0.0	2,115	GREET2_2017
Stainless Steel	5,204	11.3	0.1	5,512	GREET2_2017
Copper	3,083	6.31	0.1	3,257	GREET2_2017
Asphalt	639	0.42	0.0	651	GREET1_2017
Aggregate	300	0.20	0.0	305	GREET1_2017
Cement	2,900	0.70	0.0	2,918	GREET1_2017
Emissions (tonne)					
Structural Steel	12,748	20.6	0.10	13,293	
Rebar	3,366	5.9	0.04	3,524	
Stainless Steel	1,509	3.3	0.03	1,598	
Copper	80.2	0.2	0.00	84.7	
Asphalt	4,841	3.2	0.02	4,927	
Aggregate	24,033	16.0	0.00	24,434	
Cement	4,976	1.2	0.00	5,007	
Total	**51,553**	**50.3**	**0.19**	**52,869**	

Total power consumption during construction

Consumption	10,512,000	kWh

Source: Response Tacoma LNG Supplementary SEIS Questions, July 07, 2018, page 5

Upstream Emissions Power (see sheet Upstream, B40)

Gig Harbor Peak Shaving

General inputs		
Total LNG delivery to Gig Harbor per year	0	gal
Truck capacity	10,000	gal
Number of trips	0	

Calculation of Annual Diesel Truck Consumption	LNG Project	No project	
Distance to gig harbor	17	175	miles/trip
Annual miles for delivery	0	0	miles/year
Diesel consumption per mile	**17,738**	**17,738**	**Btu/mile**
Total Diesel Consumption	**0.00**	**0.00**	**mmBtu/year**

	Diesel Consumption	Emissions (t/year)			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project	0.0	0.00	0.00000	0.00000	0.0
No project	0.00	0.00	0.00000	0.00000	0.0

On-road trucking

Annual Fuel delivery to tractors		Consumption	
	Equipment	Mgal/year	GBtu/year
LNG	Tractor engine	0.00	0
Diesel	Tractor engine	0.00	0

				Emissions (g/MMBTU)				Old value from BID
Pathway Component	**VOC**	**CO**	**NO_x**	**CH_4**	**N_2O**	**CO_2**	**CO_{2C}**	**CO_{2C}**
Tank-to-Wheels LNG Combination Tractor	21.07	1,167	66.09	309.766737	0.03250653	55,559	57,459	57,458
Total LNG Tacoma -to-Wheels	**21.07**	**1,167**	**66.09**	**309.8**	**0.03**	**55,559**	**57,459**	**57,458**
Well-to-Wheels Diesel Combination Tractor	**31.52**	**94.58**	**228.4**	**4.75**	**0.18**	77,938	**78,186**	**78,185**
Plant-to-Tank LNG Combination Tractor	0.308	1.289	7.299	104.5	0.017	753	756	756

	Consumption	Emissions (t/year)			
Processing Step	**mmbtu/year**	**CO_2c**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project - LNG Tractor	0	0	0.00	0.00	0
Diesel tractor	0	0	0.00	0.00	0

Ship Emissions and Fuel Consumption Estimates

Source: 2018-05-25 PSE Submittal page 79, tables TOTE Vessel Emissions

Route Definition

									Time within 200 nm		
Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	Transit	Maneuvering	Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Use of extra pilot fuel for LNG Marine vessel	3%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
					Low Pressure DF LNG	Low Pressure DF LNG	
24	25.5	52200	400	720	All	All	LNG Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	LNG	LNG
Maneuvering	2.0	1,044	396	148	LNG	LNG
Hotelling	20.0	0	229	259	LNG	LNG

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	0.58	0.00	0.58	0.00	0.01	0.01	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	0.60	0.00	0.60	0.00	0.01	0.01	0.00
Emissions Rate (g/tonne MGOe)	9,376	6	9,456	17	106	105	0
Emissions Rate (g/mmBtu MGOe, LHV)	251	0	253	0	3	3	0

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	3.62	0.00	3.62	0.01	0.04	0.04	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	3.64	0.00	3.64	0.01	0.04	0.04	0.00
Emissions Rate (g/tonne MGOe)	9,310	3	9,323	17	99	99	0
Emissions Rate (g/mmBtu MGOe, LHV)	249	0	249	0	3	3	0

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	4.20	0.00	4.20	0.01	0.04	0.04	0.00
	0.02	0.00	0.04	0.00	0.00	0.00	0.00
	0.02	0.00	0.01	0.00	0.00	0.00	0.00
Total Emissions (tonne)	4.24	0.00	4.25	0.01	0.05	0.05	0.00
Emissions Rate (g/tonne MGOe)	9,320	3	9,342	17	100	100	0
Emissions Rate (g/mmBtu MGOe, LHV)	230	0	230	0	2	2	0

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	135	0.01	1.62	136	179
	1	0.00	0.01	1	1
	3	0.00	0.01	3	3
Total Emissions (tonne)	139	0.01	1.64	140	183
Emissions Rate (g/tonne MGOe)	2,172,237	153	25,601	307,200	403,493
Emissions Rate (g/mmBtu MGOe, LHV)	58,070	4	684	58,467	76,794

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	846	0.06	10.10	851	1,121
	1	0.00	0.01	1	1
	3	0.00	0.01	3	3
Total Emissions (tonne)	849	0.06	10.12	855	1,126
Emissions Rate (g/tonne MGOe)	2,172,639	152	25,881	1,880,069	2,475,106
Emissions Rate (g/mmBtu MGOe, LHV)	58,080	4	692	58,472	76,979

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e	BC	OC
	981	0.07	11.71	988	1,301	0.01	0.00
	1	0.00	0.02	2	2	0.00	0.00
	5	0.00	0.02	5	6	0.00	0.00
Total Emissions (tonne)	988	0.07	11.75	995	1,309	0.01	0.00
Emissions Rate (g/tonne MGOe)	2,172,582	152	25,841	2,187,269	2,878,599	20	0
Emissions Rate (g/mmBtu MGOe, LHV)	53,552	4	637	53,914	70,955	0	0

Methane Slip
0.43%
0.36%
0.16%

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Boiler
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8
Fuel Consumed (MT MGOe)	450.1	3.0	1.6

Within 200nm	Emissions Factors (g/kWh)									
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Outside 200nm	Emissions Factors (g/kWh)									
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Ship Emissions and Fuel Consumption Estimates

Route Definition

Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	Time within 200 nm: Transit	Time within 200 nm: Maneuvering	Time within 200 nm: Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
24	25.5	52200	400	720	Medium speed diesel 2000 - 2010	Medium speed diesel 2000 - 2010	Fuel Oil Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	MGO (0.1	MGO (0.1% S)
Maneuvering	2.0	1,044	396	148	MGO (0.1	MGO (0.1% S)
Hotelling	20.0	0	229	259	MGO (0.1	MGO (0.1% S)

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	3.72	0.15	0.34	0.13	0.07	0.07	0.07
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	3.82	0.16	0.35	0.15	0.08	0.07	0.08
Emissions Rate (g/tonne MGO)	59,739	2,578	5,478	2,287	1,191	1,141	1,184
Emissions Rate (g/mmBtu MGO, LHV)	1,597	69	146	61	32	31	32

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	198	0.01	0.00	199	201
	1	0.00	0.00	1	1
	4	0.00	0.00	4	4
Total Emissions (tonne)	203	0.01	0.00	204	207
Emissions Rate (g/tonne MGO)	3,171,667	153	48	447,826	454,393
Emissions Rate (g/mmBtu MGO, LHV)	84,787	4	1	11,972	12,147

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	23.24	0.95	2.10	0.80	0.46	0.44	0.46
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	23.34	0.96	2.11	0.82	0.46	0.44	0.46
Emissions Rate (g/tonne MGO)	59,707	2,467	5,398	2,093	1,177	1,128	1,176
Emissions Rate (g/mmBtu MGO, LHV)	1,596	66	144	56	31	30	31

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	1,235	0.06	0.02	1,241	1,259
	1	0.00	0.00	1	1
	4	0.00	0.00	4	4
Total Emissions (tonne)	1,240	0.06	0.02	1,246	1,264
Emissions Rate (g/tonne MGO)	3,171,667	152	49	2,740,069	2,780,013
Emissions Rate (g/mmBtu MGO, LHV)	84,787	4	1	73,249	74,317

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	26.96	1.10	2.43	0.93	0.53	0.51	0.53
	0.13	0.02	0.02	0.00	0.00	0.00	0.00
	0.07	0.00	0.01	0.03	0.00	0.00	0.00
Total Emissions (tonne)	27.15	1.13	2.46	0.96	0.54	0.51	0.54
Emissions Rate (g/tonne MGO)	59,711	2,482	5,410	2,121	1,179	1,130	1,177
Emissions Rate (g/mmBtu MGO, LHV)	1,472	61	133	52	29	28	29

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e	BC	OC
	1,432	0.07	0.02	1,439	1,460	0.10	0.23
	2	0.00	0.00	2	2	0.00	0.00
	8	0.00	0.00	8	8	0.00	0.00
Total Emissions (tonne)	1,442	0.07	0.02	1,450	1,471	0.10	0.23
Emissions Rate (g/tonne MGO)	3,171,667	152	49	3,187,895	3,234,406	226	504
Emissions Rate (g/mmBtu MGO, LHV)	78,179	4	1	78,579	79,725	6	12

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Aux Boiler	
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8	
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8	Looks like LNG
Fuel Consumed (MT MGOe)	450.1	3.0	1.6	

Within 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Outside 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Fugitive Emissions from Equipment Leaks

EQUIPMENT INFORMATION

Component	Phase	Fluid Serviced									Emission Factors[3] (lb/hr per component)	LDAR Control Efficiency[4]
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas		
Valves	Gas/Vapor	39	9	12	36			112	185	30	0.001370	75%
	Light Liquid					33	244				0.005370	75%
	Heavy Liquid										0.000502	0%
Pump Seals	Light Liquid					1					0.049300	75%
	Heavy Liquid										0.009820	0%
Flanges/Connectors	Gas/Vapor	0	7	2	15			28	77	15	0.000559	30%
	Light Liquid					6	114				0.000559	30%
	Heavy Liquid										0.000559	30%
Compressor Seals	Gas/Vapor	0	2	0	0	0	0	1	1	0	0.016550	75%
Relief Valves	Gas/Vapor	3	0	1	3	1	19	8	9	2	0.022030	75%
Swivel Joints	Light Liquid						4				0.049300	75%

FLUID HAP/TAP CONTENT

Pollutant	CAS / ID	Fluid								
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas
Methane Content (%wt)[1]	74-82-8	100%	100%	100%	100%	100%	100%	100%	100%	100%
n-Hexane (ppmw)[1]	110-54-3	70	5.7E-10	0	1,185	210,669	27	0	1,185	1,185
Hydrogen sulfide (ppmw)[1]	2148878	3,128	0.00035	0	22	0.010	0.21	0	22	166
Benzene (ppmw)[b, 2]	71-43-2	4.0	4.0	0	4.0	4.0	4.0	0	4.0	4.0
Ethylbenzene (ppmw)[b,2]	100-41-4	0.20	0.20	0	0.20	0.20	0.20	0	0.20	0.20
m,p-Xylene (ppmw)[b, 2]	106-42-3	1.3	1.3	0	1.3	1.3	1.3	0	1.3	1.3
o-Xylene (ppmw)[b, 2]	95-47-6	0.22	0.22	0	0.22	0.22	0.22	0	0.22	0.22
Toluene (ppmw)[b, 2]	108-88-3	3.5	3.5	0	3.5	3.5	3.5	0	3.5	3.5

POTENTIAL EMISSIONS

Pollutant	CAS / ID	Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas	Total
Hourly Emissions[c] (lb/hr)											
Methane[d]	74-82-8	0.02988000	0.01409660	0.01040010	0.03472200	0.06448280	0.52612070	0.09751390	0.14719760	0.02719950	0.95157320
n-Hexane	110-54-3	0.00000208	0.00000000	0.00000000	0.00004113	0.01358456	0.00001441	0.00000000	0.00017437	0.00003217	0.01384873
Hydrogen sulfide	2148878	0.00009345	0.00000000	0.00000000	0.00000075	0.00000000	0.00000011	0.00000000	0.00000319	0.00000451	0.00010202
Benzene	71-43-2	0.00000012	0.00000006	0.00000000	0.00000014	0.00000026	0.00000212	0.00000000	0.00000059	0.00000011	0.00000341
Ethylbenzene	100-41-4	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000010	0.00000000	0.00000003	0.00000001	0.00000016
m,p-Xylene	106-42-3	0.00000004	0.00000002	0.00000000	0.00000005	0.00000009	0.00000070	0.00000000	0.00000020	0.00000004	0.00000113
o-Xylene	95-47-6	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000012	0.00000000	0.00000003	0.00000001	0.00000019
Toluene	108-88-3	0.00000010	0.00000005	0.00000000	0.00000012	0.00000022	0.00000183	0.00000000	0.00000051	0.00000009	0.00000294
Total HAPs	HAP	0.00000028	0.00000013	0.00000000	0.00000032	0.00000060	0.00000488	0.00000000	0.00000136	0.00000025	0.00000782
Daily Emissions[c] (kg / day)											
Methane[d]	74-82-8	0.32528018	0.15345866	0.11321775	0.37799125	0.70197379	5.72746442	1.06155753	1.60242510	0.29566423	10.35903292
n-Hexane	110-54-3	0.00002263	0.00000000	0.00000000	0.00044777	0.14788443	0.00015692	0.00000000	0.00189824	0.00035025	0.15076024
Hydrogen sulfide	2148878	0.00101733	0.00000000	0.00000000	0.00000819	0.00000001	0.00000121	0.00000000	0.00003474	0.00004914	0.00111062
Benzene	71-43-2	0.00000131	0.00000062	0.00000000	0.00000153	0.00000283	0.00002312	0.00000000	0.00000647	0.00000119	0.00003707
Ethylbenzene	100-41-4	0.00000006	0.00000003	0.00000000	0.00000007	0.00000014	0.00000112	0.00000000	0.00000031	0.00000006	0.00000179
m,p-Xylene	106-42-3	0.00000043	0.00000020	0.00000000	0.00000050	0.00000094	0.00000765	0.00000000	0.00000214	0.00000039	0.00001227
o-Xylene	95-47-6	0.00000007	0.00000003	0.00000000	0.00000008	0.00000016	0.00000128	0.00000000	0.00000036	0.00000007	0.00000205
Toluene	108-88-3	0.00000113	0.00000053	0.00000000	0.00000132	0.00000244	0.00001994	0.00000000	0.00000558	0.00000103	0.00003197
Total HAPs	HAP	0.00000302	0.00000142	0.00000000	0.00000350	0.00000651	0.00005311	0.00000000	0.00001486	0.00000274	0.00008516
Annual Emissions[a] (short ton per year)											
Methane[d]	74-82-8	0.13087440	0.06174311	0.04555244	0.15208236	0.28243466	2.30440867	0.42711088	0.64472549	0.11895861	4.16789062
n-Hexane	110-54-3	0.00000910	0.00000000	0.00000000	0.00018016	0.05950036	0.00006314	0.00000000	0.00076375	0.00014092	0.06065742
Hydrogen sulfide	2148878	0.00040932	0.00000000	0.00000000	0.00000330	0.00000000	0.00000049	0.00000000	0.00001398	0.00001977	0.00044685
Benzene	71-43-2	0.00000053	0.00000025	0.00000000	0.00000061	0.00000114	0.00000930	0.00000000	0.00000260	0.00000048	0.00001492
Ethylbenzene	100-41-4	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000045	0.00000000	0.00000013	0.00000002	0.00000072
m,p-Xylene	106-42-3	0.00000017	0.00000008	0.00000000	0.00000020	0.00000038	0.00000308	0.00000000	0.00000086	0.00000016	0.00000494
o-Xylene	95-47-6	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000052	0.00000000	0.00000014	0.00000003	0.00000083
Toluene	108-88-3	0.00000046	0.00000021	0.00000000	0.00000053	0.00000098	0.00000802	0.00000000	0.00000224	0.00000041	0.00001286
Total HAPs	HAP	0.00000121	0.00000057	0.00000000	0.00000141	0.00000262	0.00002137	0.00000000	0.00000598	0.00000110	0.00003426

If Capacity is 500.000 gal/day
a factor of 2 is applaied
metric tonne&year
3.78108556

Calculations:

[a] Hourly Emissions (lb/hr) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)]

Annual Emissions (tpy) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)] x [Hours of Operation (hrs/yr)] / [2,000 lb/ton]

Hours of Operation (hrs/yr) = 8,760

[b] Pollutant Concentration (ppmw) = [Pollutant Concentration ($\mu g/m^3$)] / [453.6 g/lb] / [10^6 $\mu g/g$] / [35.31 ft^3/m^3] / [Gas Density (lb/cf)] x 10^6

Benzene Concentration ($\mu g/m^3$) =	2,980	[5]
Ethylbenzene Concentration ($\mu g/m^3$) =	144	[5]
m,p-Xylene Concentration ($\mu g/m^3$) =	986	[5]
o-Xylene Concentration ($\mu g/m^3$) =	165	[5]
Toluene Concentration ($\mu g/m^3$) =	2,570	[5]
Natural Gas Density (lb/scf) =	0.046	[5]

Notes:

[1] Provided by CB&I.

[2] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most HAPs will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we assume each fluid has the full concentration of HAP to provide a conservative emissions estimate.

[3] Terminal/Depot factors from South Coast Air Quality Management District's "Guidelines for Fugitive Emissions Calculations" (June 2003). In this guidance, the District updated emissions factors that were identified in the EPA's "Protocol for Equipment Leak Emission Estimates (November 1995).

[4] Control effectiveness from Texas Commission for Environmental Quality (TCEQ) "Control Efficiencies for TCEQ Leak Detection and Repair Programs" (July 2011) for its 28M fugitive leak detection program.

[5] See fuel characteristics in Table B-2.

[6] Assume all VOC is CH_4.

Life Cycle Associates, LLC

Fuel Life Cycle Factors Sheet

-6.89%

Lookup Key	AR5_100	AR5_20	AR4_100	AR4_20
AR Edition	AR5	AR5	AR4	AR4
Time Horizon	100	20	100	20
CO_2	1	1	1	1
CH_4	30	85	25	72
N_2O	265	264	298	289
BC	900	3200	900	3200
OC	-69	-240	-69	-240

Global Warming Potential, Molecular Weight

Species	GWP	Mol Wt	Variable Name GWP	MW
CO2	1.000	43.999	CO2_GWP	CO2_MW
CH4	25.000	16.042	CH4_GWP	CH4_MW
N2O	298.000	44.007	N2O_GWP	N2O_MW
VOC	3.117	10.209	VOC_GWP	VOC_MW
CO	1.571	28.005	CO_GWP	CO_MW
NO2	0.000	45.995	NO2_GWP	NO2_MW
BC	900.000			
OC	-69.000			
C		12.011		C_MW
H		1.008		H_MW
O		15.994		O_MW
N		14.007		N_MW
Ca		40.078		Ca_MW
Cl		35.453		Cl_MW
Na		22.990		Na_MW
S		32.065		S_MW
P		30.974		P_MW
K		39.098		K_MW

Carbon and Sulfur Ratios of Pollutants

	Ratio	Variable Name	CO_2/pollutant
Carbon ratio of VOC	0.85	VOC_C_Ratio	3.11
Carbon ratio of CO	0.43	CO_C_Ratio	1.57
Carbon ratio of CH4	0.75	CH4_C_Ratio	2.74
Carbon ratio of CO2	0.27	CO2_C_Ratio	1.00
Sulfur r atio of SO2	0.50	SO2_S_Ratio	

Conversion Factors

		Variable Name	
Energy			
J/Btu	1055.056	JperBtu	
Btu/MJ	947.82	BtuperMJ	
Btu/kWh	3412.1	BtuperkWh	
Mass			
g/lb	453.597	gperlb	
metric tonne/ton	0.907	tonneperton	907194.049
ton/metric tonne	1.102	shorttonpertonne	
lb/kg	2.205	lbperkg	
Volume			
scf/m3	35.3000	scfperm3	
L/gal	3.785	Lpergal	
Area			
acre/hectare	2.471	acreperhectare	
Distance			
cm/inch	2.54	cmperinch	
mi/naut mi	1.151	mipernaut	
ft/mi	5280		
km/mi	1.609	kmpermi	
scf/lb mol	379	scfperlbmol	
NL/g mol	22.414	Lpergmol	
Capacity			
kW/hr	1.341	kwperhp	

Emission Factors

Washington

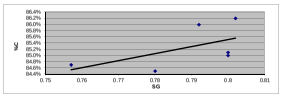
Fuel/ Application	Equipment Type	CO_2c	CH_4	N_2O	CO_2e
GREET WTT Emissions (g/mmBtu), LHV					
Diesel	Diesel Engine	78,187	4.2	0.6	78,472
Diesel	HD Truck	78,186	4.7	0.2	78,357
Diesel	Industrial Boiler	78,198	0.2	0.9	78,477
Gasoline, E10	Gasoline Engine	76,829	3.0	0.6	77,083
Bunker Fuel	**TOTE Marine Engine**	**78,579**	**1.2**	**3.7**	**79,725**
Bunker Fuel	**Residual Oil**	**85,003**	**4.2**		
Natural Gas	IC Engine	58,333	392	0.1	68,175
Natural Gas	Turbine, CC	59,410	1.1	0.1	59,474
Natural Gas	Small Boiler	59,330	1.1	0.4	59,461
Natural Gas	Large Boiler	59,410	1.1	0.8	59,660
LNG	**TOTE Marine Engine**	**53,914**	**637.0**	**3.7**	**70,955**
LNG	**IC Engine, GREET**	58,059	92		
LNG	**Marine Engine, This Study**	58,059			
LNG	Truck	57,459	309.8	0.0	65,213
LNG	NG Peak Shaving	58,308	1.1	0.4	58,439
LPG from Tacoma LNG	Boiler	68,058	1.1	1.1	68,403
LPG, conventional	Boiler	68,773	1.1	1.1	69,118
Waste Flare LPG - Tacoma LNG plant	Flare	68,773	1.1	1.1	69,118
Waste Flare gas - LNG plant	Flare	68,662	1.1	1.1	59,660
Fuel Gas	Boiler	59,410	1.1	0.8	59,660
Coal	Boiler	100,041	1.1	1.6	100,540

Specifications of Fuels, Global Warming Potentials of Greenhouse Gases, and Carbon and Sulfur Ratios of Pollutants

3.168747 0.925787

1) Specifications of Fuels

Fuel	Calculation Heating Value LHV	Heating Value LHV	HHV	Density	C ratio	S ratio	S ratio	SO_2	Total C in Fuel LHV	Carbon Factor Fossil C in Fuel LHV	Biogenic C in Fuel LHV		Heating Value LHV	Heating Value HHV	Heating Value LHV	Heating Value HHV		LHV/HHV ratio	Other Properties Density		Source	Citation
Use LHV or HHV in calculations?	1	1 – LHV, 2 – HHV																				
Liquid Fuels:	**Btu/gal**	**Btu/gal**	**Btu/gal**	**g/gal**			**Btu/lb by Wt.**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**gCO2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**		**lb/gal**	**kg/L**		
Ultra-oil	129,617	139,600	146,700	3,785	86.3%	140.00	0.000035	369	77,034	77,034	-	73.2	48.7	46.5	18,262	19,590	138.8	0.9373	7.07	0.847	CA_GREET	
Conventional gasoline	116,090	116,090	124,340	3,018	86.3%	29	0.000029	1	76,768	76,768	-	72.8	43.4	46.5	18,680	20,007	122.5	0.9336	6.21	0.745	GREET1_2012	Wang (2012)
Reform-oxated or low-sulfur gasoline	113,602	113,602	121,646	2,830	86.3%	29	0.000029	1	78,744	78,744	-	74.6	42.4	45.4	18,211	19,533	119.9	0.9323	6.24	0.747	Calculation	
CARBOB for CARFG	113,300	113,300	124,940	2,767	85.9%	15	0.000015	0	76,850	76,850	-	72.8	43.2	47.4	18,573	20,383	119.5	0.9112	6.10	0.731	CA GREET	Unnasch (2009)
CA reformulated gasoline	109,772	109,772	120,541	2,769	82.9%	11	0.000011	0	77,131	77,131	-	73.1	41.5	45.6	17,959	19,612	115.8	0.9107	6.15	0.737	CA_GREET	
U.S. conventional diesel	128,450	128,450	137,300	3,167	86.5%	200	0.000200	5	78,127	78,127	-	74.1	42.8	45.8	18,397	19,676	135.5	0.9350	6.98	0.837	CA_GREET	
Diesel for non-road engines	128,450	128,450	137,300	3,167	86.5%	165	0.000165	4	78,127	78,127	-	74.1	42.8	45.8	18,397	19,676	135.5	0.9350	6.98	0.837	CA_GREET	
Low-sulfur diesel	127,464	127,464	133,079	3,142	86.5%	11	0.000011	0.271	78,107	78,107	-	74.0	42.8	44.7	18,402	19,212	134.5	0.9578	6.93	0.830	CA_GREET	
Petroleum naphtha	116,920	116,920	125,070	2,749	85.9%	7	0.000007	0	73,104	73,104	-	69.3	44.9	48.1	19,320	20,669	123.4	0.9348	6.05	0.725	CA_GREET	
GTL naphtha	111,520	111,520	119,790	2,651	84.2%	0	0.000000	0	73,323	73,323	-	69.5	44.4	47.7	19,092	20,488	117.7	0.9314	5.84	0.700	CA_GREET	
Residual oil	140,353	141,353	150,110	3,752	85.8%	5,000	0.005000	134	85,003	85,003	-	80.6	39.5	42.2	16,968	18,148	148.1	0.9350	8.27	0.991	CA_GREET	
Bunker fuel for ocean tanker	140,353	140,353	150,110	3,752	85.8%	26,000	0.026000	369	85,003	85,003	-	80.6	39.5	42.2	16,968	18,148	148.1	0.9350	8.27	0.991	CA_GREET	
Methanol	57,251	57,251	65,200	3,168	37.5%	0	0.000000	0	72,130	72,130	-	68.4	20.1	22.9	8,639	9,838	60.4	0.8781	6.63	0.794	CA_GREET	
Ethanol	76,330	76,330	84,538	2,986	52.2%	1	0.000001	0	74,856	-	74,856	70.9	26.95119	29.6	11,587	12,832	80.5	0.9030	6.59	0.789	CA_GREET	
Butanol	99,837	99,837	105,459	3,003	64.9%	1	0.000001	0	72,944	-	72,944	69.1	34.4	37.3	14,775	16,051	105.3	0.9335	6.76	0.810	CA_GREET	
Acetone	83,127	83,127	89,511	2,964	62.0%	0	0.000000	0	80,958	-	80,958	76.7	29.6	31.9	12,721	13,698	87.7	0.9287	6.53	0.783	CA_GREET	
Oil-based Additives	116,090	116,090	124,340	2,819	86.3%	29	0.000029	1	76,768	76,768	-	72.8	43.4	46.5	18,680	20,007	122.5	0.9336	6.21	0.745	CA_GREET	
LPG	75,974	75,974	83,698	1,923	81.8%	0	0.000000	0	76,254	76,254	-	72.3	41.5	45.9	17,826	19,743	79.7	0.9029	4.24	0.508	CA_GREET	
Liquefied natural gas (LNG)	77,356	77,356	84,333	1,640	75.1%	0	0.000000	0	59,690	59,690	-	55.6	48.6	54.1	21,262	23,240	81.4	0.9148	3.63	0.435	CA_GREET	
Dimethyl ether	66,930	66,930	76,610	2,518	52.2%	0	0.000000	0	69,854	69,854	-	66.2	28.9	31.7	12,417	13,921	72.7	0.9117	5.55	0.665	CA_GREET	
Dimethoxy methane (DMM)	72,200	72,200	79,157	2,259	47.4%	0	0.000000	0	76,282	76,282	-	74.2	23.4	25.7	10,061	11,086	76.2	0.9117	7.18	0.860	CA_GREET	
Algae Oil, TAG	124,316	124,316	136,129	3,444		0	0.000000	0			-	0.0	38.1	42.3	16,372	18,191	131.2	0.9000	7.59	0.910	CA_GREET	
Vegetable Oil (FVO)				3,453							-	0.0	37.5	0.0			0		7.50	0.898	Link currently up-up	
Methyl ester (biodiesel, BD)	119,550	119,550	127,960	3,361	77.5%	0	0.000000	0	79,919	3,873	76,046	75.7	37.5	40.2	16,134	17,269	126.1	0.9343	7.41	0.888	CA_GREET	
Ethyl ester (biodiesel, BD)	119,550	119,550	127,960	3,506	77.5%				83,225	-	-	78.9	36.0	38.6	16,041	16,984	-		7.72	0.925	CA_GREET	
GTL Diesel	122,800	122,800	132,100	2,953	84.6%	0		0	74,702	-	74,702	70.8	43.9	47.2	18,863	20,291	129.6	0.9296	6.51	0.780	CA GREET	
Renewable Diesel I (SuperCetane)	117,059	117,059	125,294	2,835	87.1%	0	0.000000	0	77,275	-	77,275	73.2	43.6	46.6	18,729	20,047	123.5	0.9343	6.25	0.749	CA_GREET	
Renewable Diesel II (UOP-HDO)	122,887	122,887	130,817	2,948	87.1%	0	0.000000	0	76,544	-	76,544	72.5	44.0	46.8	18,908	20,128	129.7	0.9394	6.50	0.779	CA_GREET	
Renewable Gasoline	115,582	115,582	124,230	2,830	84.0%	0	0.000000	0	75,083	-	75,083	71.2	43.2	46.3	18,590	19,912	122.4	0.9336	6.24	0.748	CA_GREET	
Liquid hydrogen	30,593	60,920	66,033	268	0.0%	0	0.000000	0			-	0.0	120.1	141.8	51,622	60,905	32.2	0.8468	0.59	0.071	CA_GREET	
Methyl tertiary butyl ether (MTBE)	93,540	93,540	101,130	2,624	68.1%	0	0.000000	0	74,969	74,969	-	71.1	35.1	38.0	15,094	16,319	98.7	0.9249	6.20	0.743	CA_GREET	
Ethyl tertiary butyl ether (ETBE)	96,720	96,720	104,630	2,810	70.6%	0	0.000000	0	75,139	75,139	-	71.2	36.3	39.2	15,613	16,873	102.0	0.9253	6.19	0.742	CA_GREET	
Tertiary amyl methyl ether (TAME)	100,480	100,480	109,070	2,913	70.6%	0	0.000000	0	74,979	74,979	-	71.1	36.4	39.3	15,648	16,906	106.0	0.9255	6.42	0.770	CA_GREET	
Butane	94,971	94,970	103,020	2,213	82.8%	0	0.000000	0	70,680	70,680	-	67.0	45.3	49.2	19,466	21,157	100.2	0.9201	4.88	0.585	CA_GREET	
Isobutane	90,867	90,850	98,500	2,114	82.8%	0	0.000000	0	71,334	71,334	-	67.6	44.9	49.1	19,288	21,108	95.0	0.9138	4.67	0.560	CA_GREET	
Isobutylene	95,720	95,720	103,010	2,253	85.7%	0	0.000000	0	73,894	73,894	-	70.0	44.8	48.2	19,271	20,739	101.0	0.9292	4.97	0.595	CA_GREET	
Propane	84,250	84,250	91,420	1,909	81.8%	0	0.000000	0	66,290	66,290	-	64.7	46.3	50.2	19,904	21,598	88.9	0.9216	4.23	0.507	CA_GREET	
Natural gas liquids	83,686	83,686	90,850			0	0.000000	0				0.0								0.000	CA_GREET	
Still Gas (in refineries)	139,596	139,596	151,550			0	0.000000					0.0								0.000	CA_GREET	
Gaseous Fuels (@ 32F and 1atm):	**Btu/lb**	**Btu/lb**	**Btu/lb**	**g/lb**			**Btu/cu ft**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**		**gCO2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**		**lb/ft³**		CA_GREET	
Natural gas	964	964	1,050	21.48	75%	13.74	0.000014	0	59,314	59,314	-	56.2	49.0	54.3	21,074	23,339	1.0	0.9029	0.05		CA_GREET	15.34664142
Hydrogen	262	262	331	0.09	0.0%		0.000000	0	-	-	-	0.0	120.0	140.8	51,578	60,541	0.3	0.8520	0.01		CA_GREET	
Carbon Dioxide				55.08	27.3%		0.000000												0.12		CA_GREET	
Still gas (in refineries)	1,455	1,455	1,550	30.00	87.5%				31,259			29.6	46.9	51.0	20,163	21,905	2.6	0.9205	0.07		CA_GREET	
Landfill Gas	448	448	496	34.56	25.0%				58,017			55.0	13.6	15.2	5,857	6,514		0.8992	0.08		CA_GREET	
Fuel Gas (RD1)																					CA_GREET	
Shale Gas	930	930	1,030	20.40	72.4%	13.74	0.000014	0	58,178	58,178	-	55.1	48.1	53.3	20,679	22,902	1.0	0.9029	0.04		CA GREET	
Fuel Gas	930	930	1,030	20.40	72.4%	13.74	0.000014	0	58,178	58,178	-	55.1	48.1	53.3	20,679	22,902	1.0	0.9029	0.04		CA GREET	
Propane Fuel Mix (RD1)																					CA_GREET	
Solid Fuels:	**Btu/ton**	**Btu/ton**	**Btu/ton**				**Btu/lb by Wt.**		**g CO2/mmBtu**	**g CO2/mmBtu**		**gCO2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**				CA_GREET	
Coal	19,546,000	19,546,000	20,606,570		63.7%	11,100	0.011100		106,905	106,905	-	102.7	22.7	24.0	9773.2	10304.3	20,622	0.9485			CA_GREET	
Bituminous coal	22,460,600	22,460,600	23,645,900		75.0%	11,800	0.011800		111,711	111,711	-	105.9	26.1	27.3	11230.3	11723.0	23,697	0.9580			CA_GREET	
Coking coal	24,600,497	24,600,497	25,670,670		74.7%	11,800	0.011800		100,913	100,913	-	95.6	28.6	29.9	12300.2	12839.8	25,995	0.9580			CA_GREET	
Lignite																					CA_GREET	
Farmed trees	16,011,000	16,011,000	17,019,170		51.7%	0	0.000000		102,204	-	102,204	96.9	19.6	20.6	8405.5	8851.6	17,737	0.9496			CA_GREET	
Herbaceous biomass	14,797,556	14,797,556	15,582,870		42.0%	0	0.000000		95,873	-	95,873	90.7	17.2	18.1	7398.8	7791.4	15,612	0.9496			CA_GREET	
Corn stover	14,075,990	14,075,990	14,974,460		44.5%	0	0.000000		105,064	-	105,064	99.6	16.4	17.4	7038.0	7487.2	14,958	0.9400			CA_GREET	
Forest residue	13,243,490	13,243,490	14,166,165		51.7%	0	0.000000		129,736	-	129,736	123.0	15.4	16.5	6621.7	7082.1	13,973	0.9350			CA_GREET	
Sugarcane straw					50.0%																?	
Sugarcane bagasse	12,947,318	12,947,318	14,062,678		46.3%				118,843	-	118,843	112.6	15.1	16.4	6473.7	7031.3	13,660	0.9207			?	
Pet Coke	25,370,000	25,370,000	26,920,000		79.9%	68,000	0.068000		104,664	104,664	-	99.2	29.5	31.3	12685.0	13460.0	26,797	0.9424			?	
Oil sage solids																						
Lignin																					Jenny has something.	
Jet Fuel Properties	**Btu/gal**	**Btu/gal**	**Btu/gal**	**g/gal**			**Btu/lb by Wt.**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**gCO2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**		**lb/gal**	**kg/L**		
Conventional Petroleum Jet Fuel	124,287	124,287	130,968	3,016	86.0%	70	0.000070	17	77,121	77,121	-	73.1	43.2	46.2	18,573		131.2		6.59	0.792	GREET1_2012	86.2%
Ultra Low Sulfur Petroleum Jet Fuel (ULSJ)	123,041	123,041	131,595	2,988	86.0%	11	0.000011	0	76,764	76,764	-	72.8	43.3	46.3	18,616		129.8		6.61	0.792	GREET1_2012	86.0%
GTL Aviation Fuel	119,777	119,777	129,103	2,866	84.7%	0	0.000000	0	74,232	74,232	-	70.4	44.1	46.1	18,960		126.4		6.32	0.757	GREET1_2012	84.7%
GTL Lubricant Base Oil	118,256	119,256	125,477	3,028	85.1%	0	0.000000	0	79,832	79,832	-	75.7	41.2	41.2	17,717		124.3		6.59	0.8	Kuwil	85.1%
GTL Wax	126,293	126,293	135,073	3,029	85.6%	0	0.000000	0	74,664	74,664	-	70.8	44.5	44.5	19,017		133.2		6.68	0.8	Kuwil	85.6%
Fuel Fr oDshn	124,535	124,535	133,193	2,953	84.5%	0	0.000000	0	73,391	73,391	-	69.6	44.5	46.5	19,132		131.4		6.51	0.78	Kuwil	84.5%



1) Emission Factors of Fuel Combustion for Stationary Applications (grams per mmBtu of fuel burned), GREET EF Tab

	Natural Gas								Residual Oil					Diesel Fuel						Gasoline		Crude	Coal			Diesel	Diesel	Fuel Gas	Flare Gas	LNG	LPG	LPG	LNG	LNG	LNG
	Utility/ Industrial Boiler (>100 mmBtu/hr input)	Small Industrial Boiler (10-100 mmBtu/hr input)	Large Gas Turbine	CC Gas Turbine	Small Turbine	Stationary Reciprocating Engine	NG Flaring in Oil Field	Utility Boiler	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Marine Vessel TOTE	Turbine	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Turbine	Farming Tractor	Stationary Reciprocating Engine	Farming Tractor	Industrial Boiler	Utility Boiler	IGCC Turbine	Industrial Boiler	Heavy Duty Truck	Locomotive	Industrial Boiler	Flare Gas	Heavy Duty Truck	Industrial Boiler	Flaring Tacoma	NG Peak shaving	Marine Engine TOTE CASE	Marine Engine
VOC	2.540	2.540	1.016	0.267	1.056	133.316	2.593	2.089	0.903	3.651	2.027	**61.187**	0.258	0.800	1.201	2.027	0.238	63.020	59.850	191.820	0.820	1.495	0.122	0.472	5.909	5.909	2.540	2.540	26.223	4.272	4.272	2.540	**0.076**	79.908
CO	22.230	24.970	41.286	14.518	41.286	705.993	26.010	16.209	36.017	16.153	657.035	**133.341**	1.560	20.867	25.110	657.035	1.560	349.150	1,520.438	6,907.090	23.740	12.467	2.235	23.953	57.875	57.875	22.210	22.210	1,452.398	3.531	3.531	24.970	**230.273**	90.798
NOx	36.400	41.050	31.969	17.425	31.969	832.052	48.900	43.518	137.081	177.688	2,076.988	**1,471.817**	256.412	53.860	66.540	2,076.988	256.412	628.010	98.588	267.620	181.690	116.035	11.902	121.631	53.121	53.121	36.400	36.400	82.257	69.413	69.413	41.050	**229.722**	2,085.241
PM10	3.507	3.507	3.575	0.133	3.575	7.197	3.769	17.379	35.345	85.345	54.003	**29.062**	25.944	8.122	8.404	54.809	25.944	55.970	5.258	7.845	29.712	28.841	251.841	2.663	10.052	10.052	3.507	3.507	7.416	3.738	3.738	3.507	**2.465**	18.123
PM2.5	3.507	3.507	3.575	0.133	3.575	7.197	3.703	13.492	16.173	16.173	54.043	**27.850**	6.574	5.473	7.522	54.043	6.574	54.291	5.258	7.605	19.313	20.278	73.411	2.521	4.619	4.619	3.507	3.507	3.616	3.738	3.738	3.507	**2.462**	16.675
SOx	0.269	0.269	0.269	0.269	0.269	0.269	0.269	739.297	681.325	667.785	267.327	**52.279**	267.327	0.542	0.542	0.542	0.542	0.542	1.238	1.233	395.465	325.406	4.110	544.401	0.545	0.545	0.269	0.269	0.000	0.000	0.000	0.000	**0.422**	0.000
BC	0.579	0.579	0.104	0.004	0.104	1.439	3.515	0.850	1.615	1.025	43.917	**5.570**	0.657	0.947	0.750	43.917	0.657	30.564	5.256	1.034	0.568	0.872	3.157	0.109	0.072	0.072	0.579	0.579	0.267	0.617	0.617	0.579	**0.492**	2.501
OC	1.501	1.501	2.431	0.008	2.431	3.098	0.183	0.594	0.712	0.712	9.782	**12.418**	1.644	1.368	1.881	9.782	1.644	18.948	16.819	6.571	0.406	1.643	5.946	0.204	0.123	0.125	1.501	1.501	0.521	1.600	1.600	1.501	**0.000**	6.503
CH4	1.060	1.060	1.016	1.142	1.056	392.356	49.000	3.182	3.233	1.535	4.221	**1.201**	3.024	0.198	0.760	4.221	3.024	0.630	3.000	3.575	0.360	1.058	1.050	1.246	4.750	4.730	1.060	1.060	309.767	1.068	1.068	1.060	**636.970**	91.620
N2O	0.730	0.350	0.301	0.109	0.152	0.111	1.169	0.638	1.712	1.712	0.601	**3.746**	0.601	0.918	0.918	0.601	0.601	0.924	0.600	1.034	2.009	1.586	1.581	0.857	0.175	0.175	0.750	0.750	0.000	4.806	4.806	0.350	**1.746**	2.000
CO2	59,369.9	59,282.9	59,345.9	59,385.9	59,345.9	59,409.8	59,273.9	85,040.5	85,012.9	85,040.2	84,038.9	**74,578.9**	85,072.9	76,193.5	78,196.9	78,187.2	78,187.5	77,452.2	72,576.8	69,375.4	77,264.4	100,017.1	100,037.4	100,018.6	78,076.6	78,076.6	57,408.9	68,662.6	55,095.9	68,039.4	68,754.6	58,268.1	**53,552.3**	57,667.7
CO2c	59,409.8	59,329.9	59,409.8	59,409.5	59,409.8	59,833.1	59,277.9	85,072.5	85,072.3	85,077.0	85,069.4	**74,578.9**	85,072.9	76,198.5	78,196.9	78,187.2	78,190.7	76,197.0	76,828.7	76,828.6	77,304.2	100,041.2	100,041.3	100,040.7	78,186.0	78,186.0	57,451.7	68,704.8	57,459.3	68,058.5	68,773.4	58,308.2	**53,954.3**	58,073.2
Biogenic CO2																																		
		59332.81																																
		59332.81																																

Emissions Factors and Activity Assumptions

Source: UPDATED 2016 Puget Sound Maritime Air Emissions Inventory, Punlished Feb 2018 APPENDIX B: OGV EMISSIONS ESTIMATING METHODOLOGY (unless otherwise noted below table)
https://pugetsoundmaritimeairforum.org/2016-puget-sound-maritime-air-emissions-inventory/
The North American ECA introduced in 2015, requiring 0.1% sulfur content in diesel fuel compared to heavy fuel oil with high sulfur content (2.7%) used by the

Table B.2: Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Slow speed diesel	< 1999	Slow sped diesel < 1999	17	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	< 1999	Medium speed diesel < 1999	13.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	16	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2	12.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	14.4	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2	10.5	0.5	1.1	0.42	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.00	0.02	0.02	0
Gas turbine	All	Gas turbine All	6.1	0.1	0.2	0.6	0.1	0.04	0
Steamship	All	Steamship All	2.1	0.1	0.2	0.6	0.8	0.6	0

Medium speed means RPM>130
LNG emissions factors from "GHG and NOx Emissions from Gas Fueled Engines", SINTEF, 2017. PM emissions based on EPA certification data of 2017 Wartsila DF engine (rated at 8MW)
VOC emissions for LNG engines are estimated as NMVOC, based on a typical ratio of 3.8% NMVOC/CH4 emissions, as described in "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector", MARAD, 201:
https://www.nho.no/siteassets/nhos-filer-og-bilder/filer-og-dokumenter/nox-fondet/dette-er-nox-fondet/presentasjoner-og-rapporter/methane-slip-from-gas-engines-mainreport-1492296.pdf
https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf
Sulfur emissions rates for Low Pressure DF LNG engines based on SINEF report (Table 5.1) indicating 95-98% SOx reductions from LNG operation relative to MDO. Assume pilot fuel is MDO with a 0.5% sulfur content based on 2020 global sulfur ca

Table B.2: GHG Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine Model Year	Model Year	Key	CO2	N2O	CH4
Slow speed diesel	< 1999	Slow sped diesel < 1999	589	0.0310	0.0120
Medium speed diesel	< 1999	Medium speed diesel < 1999	648	0.0310	0.0100
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	589	0.0310	0.0120
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	648	0.0310	0.0100
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	589	0.0310	0.0120
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	648	0.0310	0.0100
Gas turbine	All	Gas turbine All	922	0.0800	0.0020
Steamship	All	Steamship All	922	0.0800	0.0020
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.0310	4.1000
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.0310	5.3000

Methane (CH4) slip

N2O emissions factors for LNG engines assumed to be equal to medium speed diesel

Table B.3: Low-Load Adjustment Multipliers for Emission Factors

Load	NOx	HC	CO	PM
2%	4.63	21.18	9.68	7.29
3%	2.92	11.98	6.46	4.33
4%	2.21	7.71	4.86	3.09
5%	1.83	5.61	3.89	2.44
6%	1.6	4.35	3.23	2.04
7%	1.45	3.52	2.79	1.79
8%	1.35	2.95	2.45	1.61
9%	1.27	2.52	2.18	1.48
10%	1.22	2.2	1.98	1.38
11%	1.17	1.96	1.78	1.3
12%	1.14	1.76	1.64	1.24
13%	1.11	1.6	1.52	1.19
14%	1.08	1.47	1.41	1.15
15%	1.06	1.36	1.32	1.11
16%	1.05	1.26	1.24	1.08
17%	1.03	1.6	1.17	1.06
18%	1.02	1.18	1.11	1.04
19%	1.01	1.11	1.05	1.02
20%	1	1	1.00	1.00

Source: 201.2
Table 3.17: Composite Maneuvering Load Factors

Vessel Type	Load In	Load Out
Auto Carrier	0.04	0.06
Bulk	0.04	0.05
Containership	0.03	0.03
Cruise	0.03	0.04
General Cargo	0.03	0.04
ITB	0.04	0.06
Reefer	0.02	0.03
RoRo	0.02	0.02
Tanker	0.03	0.05

Table B.7: Auxiliary Engine Emission Factors, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Medium speed diesel	≤ 1999	Medium speed diesel ≤ 1999	13.8	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2	12.2	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2	10.5	0.4	1.1	0.44	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0.00
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.003515	0.02	0.02	0.00

LNG emissions factors for aux engines assumed to be equivalent to main engine emissions factor s as both the main and aux engines are medium speec

Table B.7: Greenhouse Gas Emission Factors for Auxiliary Engines, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Medium speed diesel	All	Medium speed diesel All	683	0.029	0.008
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	683	0.029	0.008
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	683	0.029	0.008
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.029	4.1
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.029	5.3

Table B.12: Auxiliary Boiler Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	2	0.1	0.2	6	0.2	0.15	0
LNG Aux Boiler	All	LNG Aux Boiler All	2	0.1	0.2	0	0.16	0.15	0

Source: 2013 POLB Emissions Inventory

Table B.12: Auxiliary Boiler GHG Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	922	0.075	0.002
LNG Aux Boiler	All	LNG Aux Boiler All	644	0.075	0.002

Source: 2013 POLB Emissions Inventory

CO2 emissions for LNG based on ratios of carbon-per-BTU for bunker fuel and natural gas, as given in ANL GREET's fuel properties worksheet
N2O emissions for LNG assumed to be equal to fuel oil. CH4 emissions for LNG scaled based on fuel oil emissions and ratios of CH4 emissions from medium speed FO and LNG engines.

Table B.18: 2016 Auxiliary Engine Power and Load Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling
Auto Carrier	590	1224	876
Bulk	266	384	157
Bulk - Self Discharging	462	807	258
Bulk - Heavy Load	305	1223	138
Bulk - Wood Chips	266	1275	157
Container - 1000	892	1275	536
Container - 2000	1280	1911	945
Container - 3000	888	1685	965
Container - 4000	1499	2528	1196
Container - 5000	1444	2458	1202
Container - 6000	1598	2665	1461
Container - 7000	1332	2675	1325
Container - 8000	1497	4769	1449
Container - 9000	1495	4551	1383
Container - 10000	1662	2617	887
Cruise	na	na	na
General Cargo	471	1096	829
ITB	79	708	102
Reefer	1247	1168	900
RoRo	132	396	229
Tanker - Aframax	556	628	909
Tanker - Chemical	417	583	1271
Tanker - Handysize	560	600	900
Tanker - Panamax	488	600	379
Tanker - Suezmax	858	1288	2907

Table B11 2016 Auxiliary Boiler Energy Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling *
Auto Carrier	0	184	314
Bulk	0	94	125
Bulk - Self Discharging	0	103	125
Bulk - Heavy Load	0	94	134
Bulk - Wood Chips	0	134	134
Container - 1000	0	213	273
Container - 2000	0	282	361
Container - 3000	0	328	420
Container - 4000	0	371	477
Container - 5000	0	473	579
Container - 6000	0	567	615
Container - 7000	0	470	623
Container - 8000	0	506	668
Container - 9000	0	613	677
Container - 10000	0	458	581
Cruise	0	361	306
General Cargo		124	134
ITB	0	0	0
Reefer	0	237	304
RoRo	0	148	259
Tanker - Aframax	0	438	5030
Tanker - Chemical	0	136	568
Tanker - Handysize	0	144	2586
Tanker - Panamax	0	351	3421
Tanker - Suezmax	0	191	5847

*using upper limit

Table 3.22: Fuel Correction Factors

Fuel Used	NOx	VOC	CO	SO2	PM10	PM2.5	DPM	CO2	N2O	CH4
HFO (2.7% S)	1	1	1	1	1	1	1	1	1	1
HFO (1.5% S)	1	1	1	0.555	0.82	0.82	0.82	1	1	1
MGO (0.5% S)	0.94	1	1	0.185	0.25	0.25	0.25	1	0.94	1
MDO (1.5% S)	0.94	1	1	0.555	0.47	0.47	0.47	1	0.94	1
MGO (0.1% S)	1	1	1	1	1	1	1	1	1	1
MGO (0.3% S)	0.94	1	1	0.111	0.21	0.21	0.21	1	0.94	1
MGO (0.4% S)	0.94	1	1	0.148	0.23	0.23	0.23	1	0.94	1
ULSD	1	1	1	1.2007	1.18	1.18	1.18	1	1	1
LNG	1	1	1	1	1	1	1	1	1	1

LNG fuel correction factors set to 1 as direct emissions factors already account for LNG engines meeting Tier 3 standards
ULSD factors based on scaling from 0.5%S to 0.1%S MGO and further scaling 0.1%S MGO to 0.0015%!

Fuel Consumption Factors	SFOC	Units	Source
Main Engine	207.31	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Aux Engine	215.34	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Boiler	240.35	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above

Parameters	Natural Gas[a]	Flared Waste Gas[a]									Diesel
		Liquefying Case 1	Liquefying Case 2	Liquefying Case 3	Liquefying Case 4	Liquefying Case 5	Holding	LNG Transfer A1	LNG Transfer A2/A3	LNG Transfer B	
Heat Content (Btu/scf)	1,093	346	466	1,644	864	1,825	1,144	506	506	223	138,000
Density (lb/scf)	0.046	0.101	0.091	0.088	0.097	0.087	0.049	0.058	0.059	0.067	
Sulfur Content (ppmw)[c]	25	337	912	524	250	587	17	0	0	0	15
VOC Content (wt%)	NA	9.6%	14%	51%	24%	58%	17%	0.10%	0.10%	0.10%	
Benzene Concentration (mg/m^3)[b]	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	
Ethylbenzene Concentration (mg/m	144	144	144	144	144	144	144	144	144	144	
m,p-Xylene Concentration (mg/m^3)	986	986	986	986	986	986	986	986	986	986	
o-Xylene Concentration (mg/m^3)[b]	165	165	165	165	165	165	165	165	165	165	
Toluene Concentration (mg/m^3)[b]	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	

Notes:

[a] Provided by CB&I.

[c] Based on the Williams Gas Pipeline tariff of 0.25 grains per 100 cubic feet for H2S, the past 12-month maximum total sulfur (reported as H2S by Williams Gas Pipeline) of 0.603 grains per 100 cubic feet, and sulfur from odorant of 0.23 grains per 100 cubic feet (odorant injection rates provided by PSE).

[b] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most hazardous air pollutants (HAPs) will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we conservatively assume the waste gas has the full concentration of HAP.

Do not Print

4) Mass fractions of black carbon and organic carbon emissions of corresponding PM2.5 emission factors

4.1) Stationary, mobile, and open burning emission sources, %

	Natural gas						Coal		Biomass			Diesel							Gasoline			Residual fuel oil				Crude oil	Biochar	Jet fuel	
	Boiler	Engine	Combined	Simple cyc	Nonroad E	Flared	Boiler	IGCC	Industrial,	IGCC	Open burn	Industrial,	Simple cyc	Engine	Nonroad v	Nonroad E	Locomotiv	HDDT 8b	HDDT 6	Engine	Off-road v	Nonroad E	Boiler	Engine	Simple cyc	Ocean tan	Boiler	Boiler	Cruise	Landing and take-offs
BC	16.5	20.0	2.9	2.9	9.8	95.0	4.3	4.3	13.8	13.8	12.1	10.0	10.0	81.3	56.3	77.1	8.4	16.0	8.1	10.0	13.6	9.8	6.3	15.0	6.0	15.0	2.9	6.2	31.3	35.8
OC	42.8	42.8	68.0	68.0	83.7	5.0	8.1	8.1	32.6	32.6	33.9	25.0	25.0	18.1	34.9	21.1	88.6	66.0	88.0	32.0	86.4	83.7	4.4	39.0	4.0	39.0	2.1	79.9	30.3	26.0

GENERAL INPUTS

Date: 21-Sep-18
Version: 17

Comments/Source

LNG Plant Operation

LNG Product - End use share

LNG Production	Scenario A End use share	gal/day	lb/day	Mgal/ year	tonne/ year	Scenario B Enduse share	gal/day	lb/day	Mgal/ year	tonne/ year	Check gal/year (365)	Source: PSE-BID	Scenario A Volume Data
Total	**100.0%**	**250,000**	**907,193**	**88.75**	**146,083**	**100.00%**	**500,000**	**1,814,384**	**177.50**	**292,165**	182,499,845		**250,000**
On-site Peak Shaving	11.0%	27,397	99,418	9.73	16,009	5.48%	27,397	99,418	9.73	16,009	10,000,000		27,397
Gig Harbor Peak Shaving	0.0%	0	0	-	0	1.00%	5,000	18,144	1.78	2,922	1,825,000		0
On-road Trucking	0.0%	0	0	-	0	2.00%	10,000	36,288	3.55	5,843	3,650,000		0
TOTE Marine	42.7%	106,849	387,732	37.93	62,435	21.37%	106,849	387,732	37.93	62,435	39,000,000		106,849
Truck-to-Ship Bunkering	0.0%	0	0	-	0	1.00%	5,000	18,144	1.78	2,922	1,825,000		0
Other Marine (by Bunker Barge)	46.3%	115,753	420,043	41.09	67,638	69.15%	345,753	1,254,659	122.74	202,034	126,199,845		115,753

Results	-4.42%	-60.44 ktonne/year

Scenario Selection for End use Mix

	Scenario	Comment
Enduse Scenario	**B**	Pull Down

	Sub-Scenario	Comment
LPG is flared	Yes	Pull Down

	EER for Marine	Range
	1 Type in	1 to 1.015

Used GEN MIX		
Pwr Mix	**Washington** WA	Pull Down
Natural Gas Upstream	GHGenius	Pull Down

Overall Operational Hours

Overall Operational Hours	hours/year	days/year
LNG Liquefaction Plant	8,520	355.0
LNG Pretreatment	8,520	355.0
LNG Flaring	8,760	365.0
LNG Vaporizer	240	10.0
Emergency Diesel Generator	500	20.8

GWP Basis		
AR Version	AR4	Pull Down
Timeframe	100	Pull Down
BC/OC	No	Pull Down
Correct BC/OC Ratios	No	Pull Down
Correct FCFs	Yes	Pull Down
Correct Fuel Heating Value	Yes	Pull Down

Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

Energy/Electrcity Consumption LNG Plant

Scenario B Equipment Capacity/Consumption		PSE Estimate (mmBtu/hr)	Fuel	Calculated (mmBtu/hr)	Input for 250,000 gal /day	
LNG Pretreatment	NG WPG heater	18	NG		9	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 118
LNG Pretreatment	NG Regenerator heater	3.2	NG		1.6	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 119
Waste gas flaring	Waste Gas Heat Input	71.2		138.0	35.6	Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
LPG in Waste Gas		77	LPG			
Waste Gas, Mass Balance		88	C2/C5+			
Vaporizer	LNG Heater Capacity	66			66	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 120
		(gal/h)				
Emergency equipment	Diesel genrator	104.6	Diesel		104.6	Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

WPG: Water Propylene Glycol

LNG pretreatment CO_2 seperation efficiency **99.760%** Actual result based on LNG composition

Power Consumption LNG plant	Baseline	
LNG Production	1,348	kWh/1000 gal
Vaporizer	45	kWh/1000 gal

Source: page 13, PES response

Input

Overall Mass Balance

Mass Input/Output: Based on 500,000 gal/day	NG Feed lb / Day	LNG Output lb / Day	Mass ratio NG/LNG	Density LNG g/gal	Density LNG lb/gal
	2,025,990	1,814,026	1.1168	1,646	3.629

Calculated specs for Feed Gas, Emissions and Products

Component	NG - fired NG	Pretreatment Vent	To LNG	Waste Gas	LPG	Tacoma LNG
	mol%	mol%	mol%	mol%	mol%	mol%
CH4	91.31%	0.00%	5.12%	5.01%	5.36%	94.36%
C2H6	6.07%	0.00%	55.73%	79.83%	2.86%	4.32%
						0.00%
C3H8	1.54%	0.00%	21.83%	1.59%	66.26%	0.83%
i-C4H10	0.22%	0.00%	3.72%	0.27%	11.28%	0.10%
n-C4H10	0.24%	0.00%	4.55%	0.33%	13.79%	0.09%
i-C5H12	0.05%	0.00%	1.08%	1.41%	0.34%	0.01%
n-C5H12	0.03%	0.00%	0.81%	1.18%	0.00%	0.01%
C6+	0.03%	0.00%	0.84%	1.23%	0.00%	0.00%
N2	0.27%	54.81%	0.04%	0.05%	0.00%	0.28%
CO	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2S	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
O2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
He	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO2	0.22%	45.19%	6.29%	9.11%	0.10%	0.01%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
C factor (lb CO2/mmBtu)HHV	118.11	0.00	136.68	136.87	136.42	116.87
C factor (lb CO2/scf)	0.1287	0.0000	0.2741	0.2339	0.3625	0.1236
LHV (MJ/kg)	49.0	0.0	43.3	41.5	46.2	49.5
(g CO2/mmBtu), LHV	59333.7	0.0	68663.1	68755.6	68532.5	58709.2
average molar weight	17.7	35.2	36.9	32.8	45.8	17.0
mol "C" per mol gas	1.11	0.45	2.36	2.01	3.12	1.06
carbon weight %	75.22%	15.40%	76.88%	73.74%	81.81%	75.10%
Carbon factor, gCO2/MJ	56.2	0.0	65.1	65.2	65.0	55.6
g CO2/mmBtu, LHV	59,333	0	68,662	68,755	68,531	58,708
Btu/scf (LHV)	983.9	0.0	1811.0	1542.8	2399.4	954.7
Btu/scf (HHV)	1089.7	0.0	2005.6	1708.6	2657.4	1057.3
MJ/m3	36.7	0.0	67.5	57.5	89.4	35.6
SG	0.610	1.216	1.272	1.132	1.581	0.587
Density (g/ft3)	21.2	42.2	44.1	39.3	54.9	20.4
Density (g/m3)	747.9	1490.2	1558.8	1386.3	1937.1	719.3
	mol/d	mol/d	mol/d	mol/d	mol/d	mol/d
CH_4	94.536	0.000	0.181	0.121	0.059	94.356
C_2H_6	6.284	0.000	1.967	1.935	0.032	4.317
C_3H_8	1.598	0.000	0.771	0.039	0.732	0.828
i-C_4H_{10}	0.232	0.000	0.131	0.007	0.125	0.101
n-C_4H_{10}	0.250	0.000	0.160	0.008	0.152	0.090
i-C_5H_{12}	0.049	0.000	0.038	0.034	0.004	0.011
n-C_5H_{12}	0.035	0.000	0.029	0.029	0.000	0.007
C_6+	0.031	0.000	0.030	0.030	0.000	0.001
N_2	0.281	0.281	0.001	0.001	0.000	0.280
CO	0.000	0.000	0.000	0.000	0.000	0.000
H_2	0.000	0.000	0.000	0.000	0.000	0.000
H_2S	0.000	0.000	0.000	0.000	0.000	0.000
O_2	0.000	0.000	0.000	0.000	0.000	0.000
He						
CO_2	0.232	0.232	0.222	0.221	0.001	0.010
Total	103.5	0.5	3.5	2.4	1.1	100.0

947.8171

1646

75.574	77.156	81.40344129	MJ/gal

1.1075 0.902935 0.902935

Mass	NG Feed	CO2	Flare	Waste Gas	LPG	LNG	
	t/d	t/d	t/d			t/d	
CH_4	1516.5	0.0	2.9	1.9	1.0	1513.6	
C_2H_6	188.9	0.0	59.1	58.2	1.0	129.8	
	0.0	0.0	0.0	0.0	0.0		
C_3H_8	70.5	0.0	34.0	1.7	32.3	36.5	
$i\text{-}C_4H_{10}$	13.5	0.0	7.6	0.4	7.2	5.8	
$n\text{-}C_4H_{10}$	14.5	0.0	9.3	0.5	8.9	5.2	
$i\text{-}C_5H_{12}$	3.6	0.0	2.7	2.5	0.3	0.8	
$n\text{-}C_5H_{12}$	2.5	0.0	2.1	2.1	0.0	0.5	
C_6+	2.6	0.0	2.5	2.5	0.0	0.1	
N_2	7.9	0.0	0.0	0.0	0.0	7.8	
CO	0.0	0.0	0.0	0.0	0.0	0.0	
H_2	0.0	0.0	0.0	0.0	0.0	0.0	
H_2S	0.0	0.0	0.0	0.0	0.0	0.0	
O_2	0.0	0.0	0.0	0.0	0.0	0.0	
He	0.0	0.0	0.0	0.0	0.0	0.0	
CO_2	10.2	10.2	9.8	9.7	0.1	0.4	
Total	1830.7	18.1	130.1	79.5	50.6	1700.7	
Mass ratio, base LNG	1.0765	0.0106	0.0765	0.0467	0.0298	1.00	1.0000
	9,372	93	666	407	8,706		

Upstream inputs

Natural Gas upstream WA	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_{2e}**
Natural Gas Extraction	2,356	8.91	0.02	2,876.19
Extraction Fugitive	0.00	135.74	0.00	3,691.60
Natural Gas Processing	1,845	4.37	0.01	2,252.37
Processing Fugitive	778	6.83	0.00	1,246.31
Transmission & Storage	377	13.68	0.30	1,017.00
Transmission Fugitive	0.00	19.19	0.00	777.75
Total	**5,355**	**189**	**0**	**10,371**

Natural Gas upstream BC FORTIS GIG HARBOR

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			
	CO2	**CH4**	**N2O**	
Natural Gas Extraction	2,356	9	0	2876.188209
Fugitive Emissions	0	136	0	3691.599287
Natural Gas Processing	1,845	4	0	2252.371857
Transmission	778	7	0	1246.305073
Total	**4,978**	**156**	**0**	9172.464426
				298
				298

Natural Gas upstream from PSE for Lower Sensitivity

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			
	CO2	**CH4**	**N2O**	
Natural Gas Extraction and processing	6,030	46	0.16	7465.5
Transmission	824	6	0.02	1269.5
				365.5
				298
Total	**6,854**	**51**	**0**	8437
Distribution	10	2	0.00	

#VALUE!
#VALUE!

Power generation			Emissions (g/kWh)		
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**
Washington	WA	Upstream	8.2	0.3800	0.0010
		Power Plants	196.0	0.0100	0.0030
Tacoma	TA	Upstream	1	0.0454	0.0001
		Power Plants	27	0.0003	0.0003
Marginal	MA	Upstream	20	0.6462	0.0026
		Power Plants	212	0.0090	0.0014
eGRID NWPP	NW	Upstream	11	0.5569	0.0010
		Power Plants	297	0.0107	0.0047

Upstream Life Cycle Data. Source: GHGenius for BC, GREET NA Natural Gas, PSE FEIS for BC inventory

GHGenius			GREET			BC Inventory		
CO2	CH4	N2O	CO2	CH4	N2O	CO2	CH4	N2O
2355.559	8.90518	0.020759	2126.915308	8.040794784	0.018744431	6,030	46	0
	135.744			122.5679201		824	6	0
1845.076	4.371853	0.014211	1665.982414	3.947497367	0.012831328			
777.5359	6.830768		702.0639913	6.167736439				
377	13.68	0.295	1650.744077	17.69875777	1.253646641			
	19.19			40.36132186				

Table 3. 2015 GHG Emissions Rates for Natural Gas Production, Transmission, and Distribution in British Columbia

BC Natural Gas GHG Emissions (grams/MMBTU)	CO_2	CH_4	N_2O	CO_2e
Natural Gas Production and Processing	6,030	45.5	0.16	7,216
Oil and Natural Gas Transmission	824	5.9	0.02	978
Natural Gas Distribution	10	2.3	0.00	67
Total	6,863	53.7	0.18	8,260
Total Ex-Distribution	6,853	51.5	0.18	**8,193**

Crude Oil Resource Mix	U.S. Average
API Gravity	31.2
Imported Oil	43.80%
Canadian Oil Sands	10.30%
Refinery Efficiency	
Residual Oil	94.83%
Diesel	90.92%
Product Transport	
% Marine Vessel	29%
Average Distance	8,373

	Emissions (g/mmBtu), LHV		
Processing Step	**CO_2**	**CH_4**	**N_2O**
U.S. Bunker Fuel			
Crude Oil Production	12,627		
Extraction Fugitive			
Crude Oil Refining	4,049	10.49	0.07
Processing Fugitive			
Transport	419	0.69	0.01
Transport Fugitive			
Total U.S. Bunker Fuel	**17,095**	**11**	**0**
U.S. Diesel Fuel			
Crude Oil Production	13,155		
Extraction Fugitive			
Crude Oil Refining	7,386	20.46	0.14
Processing Fugitive			
Transport	376	0.66	0.01
Transport Fugitive			
Total U.S. Diesel Fuel	**20,918**	**21**	**0**
U.S. Gasoline Fuel			
Crude Oil Production	11,533		
Extraction Fugitive			
Crude Oil Refining	13,232		
Processing Fugitive			
Transport	491		
Transport Fugitive			
Ethanol blending	-1,006		
Total WA. Gasoline Fuel	**24,251**	**0**	**0**

INPUTS - NO PROJECT

Diesel fuel storage pumping	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to vehi	0.01

Loss of LNG Peak Shaving - Boiler oper	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to boile	0.01

ENDUSE

Gig harbor Delivery

Distance for LNG delivery by Diesel Tru	miles
Project	17
No Project	175

Truck capacity	gallons/trip
Capacity per trip	10,000

Energy Consumption	BTU/mile
	17,738

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
NEW LNG Plant					
Construction Emissions					
Total Construction			**1,581**	**63,232**	**9**
Direct (Equipment)			182	7,289	1.0
Upstream Life Cycle (Equipment)			20	812	0.1
Upstream Life Cycle (Power)			57	2,262	0.3
Upstream Life Cycle (Material)			1,322	52,869	7.4
Operational Emissions					
Upstream life cycle			**207,844**	**8,313,769**	**1,171**
Natural Gas			154,504	6,180,176	870
Power LNG production			51,477	2,059,079	290
Diesel Emergency			143	5,730	1
Power LNG Vaporizer -Peak Shaving			1,718	68,738	10
Gig harbor Diesel truck fuel			1.2	46	0.01
Direct LNG Plant			**108,997**	**4,359,871**	**614**
LNG Production			94,333	3,773,303	531
Vaporizer -On-site Peak Shaving			942	37,674	5
Marine vessel bunkering, truck CH4			13,722	548,893	77
End Use LNG	**177.50**	**13,695**	**987,120**	**39,484,803**	**5,561**
On-site Peak Shaving	9.73	750	43,854	1,754,145	247
Gig harbor LNG	1.78	137	8,129.5	325,180	46
On-road Trucking	3.55	274	17,862	714,482	101
TOTE Marine	37.93	2,927	207,659	8,306,355	1,170
TOTE Marine Diesel Pilot fuel			7,000	279,992	39
Truck-to-Ship Bunkering	1.78	137	9,717	388,695	55
Truck-to-Ship Bunkering Pilot Fuel			328	13,102	2
Other Marine LNG (by Bunker Barge)	122.74	9,470	670,204	26,808,168	3,776
Other Marine Diesel Pilot Fuel			22,367	894,685	126
Total Emissions (Tacoma LNG)			**1,305,542**	**52,221,676**	**7,355**

NO ACTION

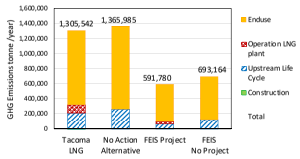
Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Upstream Displaced Emissions					
Total Upstream			**260,100**	**10,403,984**	**1,465.35**
No Peak Shaving - Diesel Dual Fuel		750	16,127	645,097	91
Upstream Gig harbor Peak Shaving		137	2,174	86,947	12.25
Upstream On-road trucking		247	5,297	211,886	30
Upstream TOTE Marine Diesel		3014	64,775	2,591,007	365
Upstream Truck-to-Ship Bunkering		141	2,454	98,172	14
Upstream Other Marine Diesel (by Bunker Barge)		9729	169,272	6,770,875	954
End Use Emissions					
Total End Use Diesel /Fuel Oil/LNG	**110.7**	**14,018**	**1,105,885**	**44,235,403**	**6,230**
Diesel Peak Shaving for Power	5.89	750	58,891	2,355,620	332
Gig harbor LNG	1.78	137	8,168	326,739	46.02
On-road Trucking	1.93	247	19,316	772,637	109
TOTE Marine Diesel	23.65	3,014	240,326	9,613,048	1,354
Truck-to-Ship Bunkering	1.11	141	11,246	449,841	63
Other Marine Diesel (by Bunker Barge)	76.33	9,729	767,938	30,717,517	4,326
Total Emission (No Action)			**1,365,985**	**54,639,386**	**7,696**
Net Emission reduction			**-60,443**	**-2,417,711**	**-341**
in percentage			-4.42%	-4.42%	-4.42%

Short tables

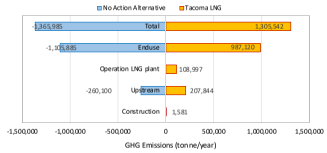
Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Tacoma LNG					
Construction			**1,581**	**63,232**	**9**
Upstream Life cycle			**207,844**	**8,313,769**	**1,171**
Direct LNG Plant			**108,997**	**4,359,871**	**614**
End Use LNG	**177.50**	**13,695**	**987,120**	**39,484,803**	**5,561**
On-site Peak Shaving	9.73	750	43,854		
Gig harbor LNG	1.78	137	8,129		
On-road Trucking	3.55	274	17,862		
TOTE Marine	37.93	2927	207,659		
TOTE Marine Diesel Pilot fuel	0.00	0	7,000		
Truck-to-Ship Bunkering	1.78	137	9,717		
Truck-to-Ship Bunkering Pilot Fuel			328		
Other Marine LNG (by Bunker Barge)	122.74	9470	670,204		
Other Marine Diesel Pilot Fuel			22,367		
Total	**177.50**	**13,695**	**1,305,542**	**52,221,676**	**7,355**
NO ACTION					
Upstream Life Cycle			**260,100**	**10,403,984**	**1,465**
Total End Use Diesel /Fuel Oil/LNG	**110.68**	**14,018**	**1,105,885**	**44,235,403**	**6,230**
Diesel Peak Shaving for Power	5.89	750	58,891		
Gig harbor LNG	1.78	137	8,168		
On-road Trucking	1.93	247	19,316		
TOTE Marine Diesel	23.65	3,014	240,326		
Truck-to-Ship Bunkering	1.11	141	11,246		
Other Marine Diesel (by Bunker Barge)	76.33	9,729	767,938		
Total	**110.68**	**14,018**	**1,365,985**	**54,639,386**	**7,696**
Net Emissions		-4.42%	**-60,443**	**-2,417,711**	**-341**
				-4.42%	-4.42%

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GHG Emissions (tonne/year)	Tacoma LNG	No Action Alternative	FEIS Project	FEIS No Project
Construction	1,581			
Upstream Life Cycle	207,844	260,100	69,299	119,238
Operation LNG plant	108,997	0	33,539	0
Enduse	987,120	1,105,885	488,942	573,926
Total	1,305,542	1,365,985	591,780	693,164
Net Emissions	**-60,443**		-101,385	
	-0.0442485		-14.63%	



GHG Emissions (GBtu/ year)	No Action Alternative	Tacoma LNG	Net Emissions
Construction		1,581	
Upstream	-260,100	207,844	
Operation LNG plant	0	108,997	
Enduse	-1,105,885	987,120	
Total	-1,365,985	1,305,542	-60,443



Direct End Use
Scenario: 500,000 gal/year

Scenario B

	LNG Enduse	Equipment Type	Consumption Mgal/yr	GBtu, LHV/yr	EER	Btu/gal		
	Power Peak Shaving							
	LNG	Dual Fuel Turbine	9.73	750	1	77,156	9.726027	
	Displaced Diesel	Dual Fuel Turbine	5.89	750		127,464	5.88731	
	Gig Harbor LNG							
	LNG	NG Boiler	1.78	137	1	77,156	1.775	
	LNG	NG Boiler	1.78	137		77,156	1.775	
	On-road Trucking							
								ARB LNG Pathway
	LNG	Truck Engine	3.55	274	0.9	77,156	3.55	document
	Diesel	Truck Engine	1.93	247		127,464	1.933981	
	TOTE Marine							
loss factor	LNG	Marine Engine	37.93	2,927	1	77,156	37.93151	
	Pilot diesel Fuel for LNG	Marine Engine	0.69	88	1	127,464	0.625559	
	Displaced MDO Fuel	Marine Engine	23.65	3,014		127,464	21.47753	
	Truck-to-Ship Bunkering							
loss facor	LNG	Marine Engine	1.78	137	1	77,156	1.775	
	Pilot Fuel for LNG	Marine Engine	0.03	4		127,464	0.029273	
	Displaced MDO Fuel	Marine Engine	1.11	141		127,464	1.005038	
	Other Marine (by Bunker Barge)							
	LNG	Marine Engine	122.74	9,445	1	77,156	122.7423	
	Pilot Fuel for LNG	Marine Engine	2.22	283	1	127,464	2.024243	
	Displaced MDO Fuel	Marine Engine	76.33	9,729		127,464	69.49901	
	Total LNG		177.500	13,670				

T 4.2

	Scenario B GHG Emissions	Equipment Type	Emissions (tonne/year) CO_2c	CH_4	N_2O	CO_2e		
	Power Peak Shaving							B
	LNG	Duct Firing	43,755	1	0.26	43,854		43853.64
	Diesel	Duct Firing	58,682	0	0.69	58,891		58890.5
	Gig Harbor Delivery							
Diesel	LNG Tacoma	Truck Engine	4	0	0.00	4.2		4.200144
Diesel	LNG	Truck Engine	43	0	0.00	43		43.17362
	LNG Tacoma End Use	NG Boiler	8,125	0	0	8,143		8143.21
	LNG End Use	NG Boiler	8,125	0	0	8,143		8143.21
	On-road Trucking							
	LNG	Truck Engine	15,738	85	0.01	17,862		17862.04
	Diesel	Truck Engine	19,274	1	0.04	19,316		19315.93
	TOTE Marine							
	LNG	Marine Engine	157,787	1,864	11	207,659		226164.6
	Pilot fuel	Marine Engine	6,899	0	0.33	7,000		7611.397
	MDO Fuel	Marine Engine	236,870	4	11.29	240,326		261324.6
	Truck-to-Ship Bunkering							
	LNG ind. Pilot fuel	Marine Engine	7,384	87	0.51	9,717		10575.31
	Pilot fuel	Marine Engine	323	0	0.02	328		356.1743
	Diesel Truck	Truck Engine	0	0	0.00	0	NET 0 diffe	0
	MDO Fuel	Marine Engine	11,084	0	0.53	11,246		12228.65
	Other Marine (by Bunker Barge)							
								Marine Fuel +
	LNG	Marine Engine	509,247	6,016	35	670,204		70955.01 Operations losses
	Pilot fuel	Marine Engine	22,266	0	0.33	22,367		24399.05
	MDO Fuel	Marine Engine	764,482	4	11.29	767,938		837700.8

Assume barge delivers MDO for displaced emissions

Scenario B

LNG Enduse	Mgal/yr	GBtu, LHV/yr
Power Peak Shaving	9.73	750
Gig Harbor LNG	1.78	137
On-road Trucking	3.55	274
TOTE Marine	37.93	2,927
Truck-to-Ship Bunkering	1.78	137
Other Marine (by Bunker Barge)	122.74	9,445
Total LNG	177.500	13,670

Tacoma LNG Emissions

Scenario B

		Emissions (tonne/year)			
LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
LNG	Dual Fuel Boiler	43,755	1	0	43,854
Gig harbor Delivery					
LNG Tacoma	Truck Engine	4	0	0	4
LNG Tacoma End Use	NG Boiler	8,125	0	0	8,143
On-road Trucking					
LNG	Truck Engine	15,738	85	0	17,862
TOTE Marine					
LNG	Marine Engine	157,787	1,864	11	207,659
Pilot fuel	Marine Engine	6,899	0	0	7,000
Truck-to-Ship Bunkering					
LNG incl. Pilot fuel	Marine Engine	7,384	87	1	9,717
Pilot fuel	Marine Engine	323	0	0	328
Diesel Truck	Truck Engine	0	0	0	0 NET 0
Other Marine (by Bunker Barge)					
LNG	Marine Engine	509,247	6,016	35	670,204
Pilot fuel	Marine Engine	22,266	0	0	22,367
Total End Use		**771,529**	**8,054**	**48**	**987,138**

Non Action

Scenario B

		Emissions (tonne/year)			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		15,697	15.8	0.1	16,125
Diesel - Power pumping		2	0.0	0.0	2
Diesel - End use	Dual Fuel Boiler	58,682	0.1	0.7	58,891
Gig harbor Delivery					
LNG	Truck Engine	43	0.0	0.0	43
LNG End Use	NG Boiler	8,125	0.1	0.0	8,143
On-road Trucking					
Diesel	Truck Engine	19,274	1.2	0.0	19,316
TOTE Marine					
MDO - Upstream		63,055	63.6	0.4	64,775
MDO fuel	Marine Engine	236,870	3.6	11.3	240,326
Truck-to-Ship Bunkering					
MDO Fuel	Marine Engine	11,084	0.2	0.5	11,246
Other Marine (by Bunker Barge)					
MDO - Upstream		166,313	108.8	0.8	169,272
MDO fuel	Marine Engine	764,482	3.6	11.3	767,938
Total End Use		**1,327,928**	**181**	**25**	**1,339,950**

Scenario B		**Emissions (tonne/year), LHV**			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		15,697	16	0	16,125
Diesel - Power pumping	Power	2	0	0	2
Diesel - End use	Dual Fuel Boiler	58,682	0	1	58,891
Total		**74,380**	**16**	**1**	**75,017**

LCA

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Extraction	2,356	8.9	0.021	2,584
Extraction Fugitive	0	135.7	0.000	3,394
Natural Gas Processing	1,845	4.4	0.014	1,959
Processing Fugtive	778	6.8	0.000	948
Transmission & Storage	377	13.7	0.295	807
Transmisison Fugitive	0.0	19.2	0.000	480
Total Natural Gas	**5,355**	**189**	**0.3**	**10,172**

Comparision to reported values
Provided BID Report page 4

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Production & Processing	6,030	45.5	0.160	7,215
Transmission & Storage	824	5.9	0.0	977
Natural Gas Distribution	10	2.3	0	68
Total	6,864	53.70	0.18	8,260
Total Ex-Distribution	**6,854**	**51.40**	**0.18**	**8,193**

Energy Input/Output: Based on 250,000 gal/day	NG Feed	LNG Output	ratio NG/LNG	NG Btu/gal LNG	
NG Feed (lb/day)	2,025,990	1,814,026	1.1168		with Loss Factor
LHV (based on mass ratio see INPUT	42,695	38,570	1.107	85,407	85,577
LHV, Btu/gal	21,074	21,262			

Natural Gas upstream LNG	GHG Emissions (kg/1000 gal LNG)				
	CO_2	**CH_4**	**N_2O**	**CO_2e**	just CH4
Natural Gas upstream	458.3	16.2	0.0	870.4	403.8
					71,666
					358,332

Source: Provided Report BID page 14

Table 9. Tacoma Power Generating Mix (2016)

Fuel Type	Percentage Used
Hydro Power	84%
Nuclear*	6%
Coal*	2%
Natural Gas	1%
Wind	7%

*Represents a portion of the power Tacoma Power gets from the Bonneville Power Administration.

Table 10. Upstream GHG Emissions Associated With Facility Electrical Energy Use

Source: Provided Report BID page 14

Power generation			Emissions (g/kWh)			
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Washington	WAUP	Upstream	8.2	0.3800	0.0010	18
	WAPP	Power Plants	196.0	0.0100	0.0030	197
Tacoma	TAUP	Upstream	1.3	0.0454	0.0001	2
	TAPP	Power Plants	27.4	0.0003	0.0003	27
Marginal	MAUP	Upstream	19.7	0.6462	0.0026	37
	MAPP	Power Plants	212.3	0.0090	0.0014	213
eGRID NWPP	NWUP	Upstream	11.5	0.5569	0.0010	26
	NWPP	Power Plants	297.2	0.0107	0.0047	299
Selected GEN MIX	**WA**					
Washington	**WAUP**	**Upstream**	**8.2**	**0.3800**	**0.0010**	**18**
	WAPP	**Power Plants**	**196.0**	**0.0100**	**0.0030**	**197**

Power Consumption LNG Production		Upstream Emissions from Tacoma Power Supply							
		VOC	CO	NOx	BC	OC	CH4	N2O	CO2
Emissions Rate	grams/mmBTUel	0.65	1.63	3.83	0.02	0.05	10.92	0.09	5942.00
per Power	g/kWhel	0.00	0.01	0.01	0.00	0.00	0.04	0.00	20.27
Emissions Rate	g/mmBTU LNG	0.04	0.101	0.237	0.001	0.003	0.674	0.006	367.1
of End product	**kg/1000 gal**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**27.99**

Power Consumption LNG Construction	Baseline	GHG Emissions (tonnes)			
Power Total during construction (kWh)	10,512,000	CO_2	CH_4	N_2O	CO_2e
Mix	**WAUP**	**2,146.6**	**4.1**	**0.0**	**2,261.6**

Power Consumption LNG Production	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	1348	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**275.3**	**0.5**	**0.0**	**290.0**

Power Consumption Vaporizer/ Peak Shaving	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	45	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**9.2**	**0.0**	**0.0**	**9.7**

NO PROJECT

Diesel fuel storage pumping	Consumption, Estir	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to vehicle	0.01	2.042	0.004	0.000	2.151
Total		2.042	0.004	0.000	2.151

NO PROJECT

Loss of LNG Peak Shaving - Boiler operation with	Consumption, Estir	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to boiler	0.01	2.042	0.004	0.000	2.900
Total		2.042	0.004	0.000	2.900

Crude Oil Resource Mix	U.S. Average	WA
API Gravity	31.2	30.8
Imported Oil	43.80%	37.10%
Canadian Oil Sands	10.30%	13.20%
Refinery Efficiency		
Residual Oil	94.83%	94.80%
Diesel	90.92%	90.90%
Product Transport		
% Marine Vessel	29.02%	46.00%
Average Distance	8,373.0	2,470.0

	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
WA. Bunker Fuel				
Crude Oil Production	12,627	0	0	12,627
Extraction Fugitive	0	0	0	0
Crude Oil Refining	4,049	10.491	0.073	4,333
Processing Fugitive	0	0.000	0.000	0
Transport	419	0.692	0.009	439
Transport Fugitive	0	0.000	0.000	0
Total U.S. Bunker Fuel	**17,095**	**11.18**	**0.082**	**17,399**
WA Diesel Fuel				
Crude Oil Production	13,155	0	0.0	13,155
Extraction Fugitive	0	0	0.0	0
Crude Oil Refining	7,386	20	0.1	7,939
Processing Fugitive	0	0	0.0	0
Transport	376	1	0.0	395
Transport Fugitive	0	0	0.0	0
Total U.S. Diesel Fuel	**20,918**	**21.11**	**0.144**	**21,488**
WA. Gasoline Fuel				
Crude Oil Production	11,533	0.0	0.0	11,533
Extraction Fugitive	0	0.0	0.0	
Crude Oil Refining	13,232	0.0	0.0	13,232
Processing Fugitive	0	0.0	0.0	
Transport	491	0.0	0.0	491
Transport Fugitive	0	0.0	0.0	
Ethanol blending	-1,006	0.0	0.0	-1,006
Total WA. Gasoline Fuel	**24,251**	**0.0**	**0.0**	**24,251**

PROJECT

Diesel fuel for emergency genset	Consumption	Emissions (kg/1000 gal), LHV			
Processing Step	**mmBtu/ 1000 gal LNG**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Upstream Diesel production	0.0375569	0.79	0.00	0.00	0.8
Total		1	0	0	0.8

PROJECT

Gig Harbor Diesel Truck fuel

Upstream Diesel production	Consumption	Emissions (tonne/yr), LHV			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
LNG Project	53.52	1.12	0.00	0.00	1.15

Upstream GHG Emissions for Tacoma LNG

Pollutant	CO_2	CH_4	N_2O	CO_2e	Use Rate
Emissions (kg/1000 gal), LHV					
Upstream Natural Gas	458.3	16.2	0.0	870.4	85,577 Btu/gal
Upstream Power LNG production	275.3	0.5	0.0	290.0	1.35 kWh/gal
Upstream Diesel Emergency	0.79	0.00	0.00	0.8	37.6 Btu/gal
Upstream Power LNG Vaporizer	9.2	0.0	0.0	9.7	0.045 kWh/gal
Total Upstream	**743.5**	**16.7**	**0.0**	**1170.9**	

NO PROJECT

	Upstream LNG/Diesel/Bunker fuel production	Consumption		Emissions (tonne/yr)			
	Processing Step	**GBtu/year**	**Fuel**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
D	No Peak Shaving - Diesel Boiler operation	750	Diesel	15,697	16	0.11	16,125
N	Gig harbor NG & LNG production	137	Natural Gas	1,621	21.4	0.0	2,162
D	Gig harbor Diesel truck fuel	0.55	Diesel	11.5	0.01	0.00	11.8
D	Diesel Storage On-road trucking	247	Diesel	5,156	5.2	0.04	5,297
B	TOTE Marine Diesel	3,014	MDO	63,055	64	0.43	64,775
B	Truck-to-Ship Bunkering	141	MDO	2,411	1.6	0.01	2,454
D	Other Marine Diesel	9,729	MDO	166,313	109	0.80	169,272
	Total			254,265	217	1.4	260,097
							260,100

DO NOT PRINT

Tacoma LNG Plant

Total NG end use **13,670 GBtu, LHV/year**
On-site Peak Shaving 750 GBtu, LHV/year
LNG Output 12,920 GBtu, LHV/year

LNG Pretreatment
Operational hours 8,520 hr/yr
NG WPG heater 18 mmBtu/hr
153,360 mmBtu/year
NG Regenerator heater 3.2 mmBtu/hr
27,264 mmBtu/year
Total Annual Consumption **180,624 mmBtu/year**
CO2 separation efficiency 99.76%

Waste gas Flare
Operational hours 8,760 hr/yr
Waste Gas Flow 80,834 scf/hr
Waste Gas Heat Capacity 71.2 mmBtu/hr
Total Heat Input **623,712 mmBtu/yr**
Separated CO2

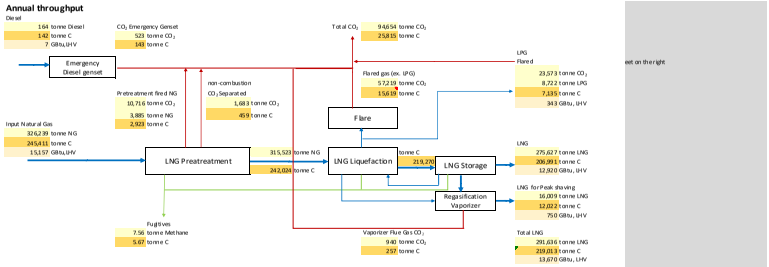
Vaporizer
Operational hours 240 hr/yr
LNG Heater Capacity 66.00 mmBtu/hr
Total Consumption 15,840 mmBtu Fuel gas
Power requir. (Grid) 0.04500 kWh/gal
0.03347 kWhel/mmBtu
(estimate need of 1830 Btu/gal LNG)

Emergency equipment
Diesel generator/ LSSD
Operational hours 500 hr/yr
Capacity 1,500 kW
Electricity generation 750,000 kWh/yr
Diesel consumption 104.6 gal/h
52,300 gal/year
6,666 mmBtu/year
164.3 tonne/year

Liquefaction
Power requir.s. (Grid) 1.35 kWh/galLNG
Operational hours Liqu. 8,520 hr/year

Fugitives - Refrigerant losses through Compressor Seals
tonne/year
Methane 7.56

Annual throughput



The carbon balance accounts for the hydocarbons and CO_2 in the natural gas such that the carbon entering the LNG system is equal to the carbon in the combustion gas, fugitive emissions and LNG. Carbon in the Flared gas ex. LPG is determined by difference. Inputs to the analysis include overall NG to LNG mass balance, and fired pretreament NG. Waste gas to flare is based on elemental composition and mass flows.

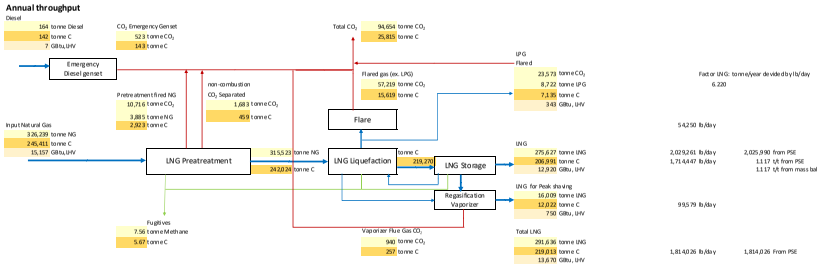
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Carbon Mass balance

	Input/output		CO_2	Methane	C content		
	lb/day	tonne/yr	tonne/yr	tonne/yr	**tonne/yr**	**Comments**	**Source**
Input NG							
Natural gas	2,025,990	326,239			**245,411**		
Total NG Input	2,025,990	326,239			**245,411**		
Products							
LPG, estimated	0	0			**0**	A	
LNG	1,814,026	291,636			**219,013**		
Total Products	1,814,026	291,636			**219,013**		
Emissions							
Pretreatment			10,716		**2,923**		Heater fired by NG and boil off gas (BOG). BID response pdl - 9 page 12 PSE-BID
CO_2 Separated (non-combustion)			1,683		**459**	B	Using Gas composition and given separation efficiecy
Flaring (combustion)			55,535		**15,619**		Flaring is used to close C-Balance
Flaring from LPG (combustion)			23,573		**7,135**		Using gas composition calculation and EF of LPG boiler (no flar data)
Fugitives CH_4				756	**6**		Using given inventory see Sheet Fugitives 95
Vaporizing on-side peak shaving			940		**257**		Boiler primary fuel is NG. However, the fuel gas mix can include compressed boil-off gas (BOG). BID response p 9
Total Emissions			92,448	8	**26,398**		
Total Product + Emissions			92,448	8	**245,411**		
Total NG Input - Product + Emissions					**0**		

Comments:
A: How much LPG is produced as product? LPG production is not mentioned in the Response.
B: In the FEIS report page 103 the value is 10,700 tonne/year. Could you clarify this?

Annual throughput



The carbon balance accounts for the hydocarbons and CO_2 in the natural gas such that the carbon entering the LNG system is equal to the carbon in the combustion gas, fugitive emissions and LNG. Carbon in the Flared gas ex. LPG is determined by difference. Inputs to the analysis include overall NG to LNG mass balance, and fired pretreament NG. Waste gas to flare is based on elemental composition and mass flows

LNG PLANT

Direct Combustion Emission Rate		Emission Factor (g/mmBtu), LHV			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	Boiler, NG	59,330	1.06	0.35	59,461
Waste gas flaring	Flare	68,662	1.06	1.07	59,640
LPG Flaring	Flare	68,773	1.07	1.07	69,118
Emergency Generator	Diesel Genset	78,187	4.2 2	0.60	78,472
Vaporizer	Boiler, NG	1,252	0.02	0.01	1,255
Vaporizer	Pump Power	1	0.00	0.00	1.0

		Emissions (tonne/year)			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	Boiler, NG	10,716	0.19	0.06	10,740
Waste Gas Flaring	Flare	57,219	0.88	0.89	57,506
LPG flaring	Flare	23,573	0.37	0.37	23,691
Emergency Generator	Diesel Genset	521	0.03	0.00	523
Non-combustion CO2 from pretreat	Vent/flare	1,683	0.00	0.00	1,683
Fugitives	Equip. Leaks	0	7.56	0.00	189
Sub - Total		**93,712**	**9**	**1**	**94,333**
Vaporizer	Boiler	940	0	0	942
Vaporizer	Pump - power	0.7	0.0	0.0	0.8
Fugitives					
Fugitives Ship/Barge Loading	Equip. Leaks	0.0	7.5	0.0	187.8
Fugitives - Bunker Vessel Storage	Equip. Leaks	0.0	5.28.5	0.0	1,322.5
Fugitives - Truck to Ship	Equip. Leaks	1.0	12.9	1.0	322.1
Total		**94,654**	**558**	**2**	**108,898**

Info for Table

		Emissions (tonne/year)			
Process	Equipment	CO_2	CH_4	N_2O	CO_2e
Vaporizer	Boiler	940	0	0	942
Vaporizer	Pump - power	0.7	0.0	0.0	0.8

Flare Check

55,553

Specific Emission g/mmBtu (LNG product)

Process	CO_2	CH_4	N_2O	CO_2e
LNG Pretreatment	783.9	0.0	0.0	785.6
Emission from flaring (co	4185.6	0.1	0.1	4206.6
Emission from LPG flaring	1724.4	0.0	0.0	1733.0
Emergency Generator	38.1	0.0	0.0	38.3
Non-combustion CO2 fror	123.1	0.0	0.0	123.1
Fugitives	0.0	0.6	0.0	1.38
Sub - Total	**685.5.2**	**0.7**	**0.1**	**6900.3**
Total	6,924	4.1	0	7,973

BUNKERING

LNG Bunkering and Vessel loading Emissions	CH_4 (g/mmBTU delivered)	CO_2e (g/mmBTU delivered)	Fraction of Gas Delivered by this Process	
Ship/Barge Loading	2.4	58.82	98%	Explain losses
Bunker Vessel Storage	6.4	160	7.3%	
Truck/Ship-to-Ship Transfer	47.0	1,176	7.5%	
Total	55.8	1,060		
GREET				

100.00 gal
0.5 L
0.2 g
0.000 25

loss

Loss Factor	0.198% Gas lost through the system
Net Delivered LNG	300,000 gallons per typical bunkering event

Bunker Barge loading

Vapor Displaced	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_2e Emissions (g/mmBTU)
0.2.2%	95.00%	0.01.1%	380,994	419	2.4	59

Bunker Vessel Storage

Boil off rate (%/day)	Duration (days)	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_2e Emissions (g/mmBTU)
0.1.5%	4	95.00%	0.0 300%	381,95 2	11.4	6.4	160

New ships have 0.1% loss

Truck/Ship-to-Ship Transfer

Vapor Displaced	Recovery Rate	Loss per Bunkering Event	Volume per Bunkering Event (gallons)	Volume Lost per Bunkering Event (gallons)	CH_4 Emissions (g/mmBTU)	CO_2e Emissions (g/mmBTU)
0.2 2%	0.00 %	0.22%	380,838	838	47.0	1,176

Bunkering and Transfer Fugitives	Volume (LNG gallons/year)	Loss Factor	CH_4 Emissions (LNG Gallons/year)	CH_4 Emissions (tonne/year)	CO_2e Emissions (tonne/year)	
TOTE	41,481,507	0.0 110%	4,563	8	188	Check if exist 1
Other Bunker Barge	122,742,315	0.2 610%	3 21,080	5.28	13,21.2	1
Truck-to-Ship Bunkering	3,5 50,000	0.2 205%	7,827	13	322	1
Total	**167,77 3.8 22**	**0.19 88%**	**313,471**	**5 49**	**13,72 2**	

https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151 124-final.pdf

Source: 2018-05-25 PSE Submittal page 78, table LNG Bunkering Emissions
see also https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151 124-final.pdf

TOTAL

Total LNG plant emission	Emissions (tonne/year)						
	CO_2	CH_4	N_2O	CO_2e	C	2 x CO_2e FEIS	
LNG Pretreatment Boiler	10,716	0.19	0.06	10,740	2926	58.60	uses EF of 53.06 kg/mmBtu for NG See EXCEL 2018 05-25 Tacoma
Pretreatment CO2	1,683			1,683	460		
Flare waste Gas	57,219	1	1	57506	15,621	56,262	FEIS uses EF provided by CB&I and flare vendor See EXCEL 2018 0
Flare LNG	23,573	0	0	2 3691	6436	Included above	
Fugitives	0	7.56	0.00	189	8	190	
Emergency Generator	521	0.03	0.00	523	143	5.36	
Sub-Total	**93,712**	**9.03**	**1.32**	**94,333**	**25,595**	0.0	0 Waste gas for heater
Vaporizer	940	0.02	0.01	942	257		
Marine Vessel Bunkering, truck	0	548.89	0.00	1,572 2	550	1,684	
Total	**94,652**	**9.05**	**1.33**	**95,274**	**25,852**	68,532	

Propane Volume

345 68 kg/day
127 76 gal/day

Source: BID REPORT, ATTACHMENT F (1 page)

LNG plant	Emissions (tonne CO2e/year)			
	CO_2	CH_4	N_2O	CO_2e
Flare	27,110	40.0	0.0	28,231
Vaporizer	841	0.0	0.0	842
WPG	4,183	0.1	0.0	4,186
Regen	744	0.0	0.0	744
Diesel Generator	534	0.0	0.0	536
Fugitives	–	–	–	95
Total	**33,411**	**41**	**0**	**34,533**

Energy Efficiency

Input	Unit	Tacoma	CA_GREET
NG	Btu/LNG	1,117	1,019
Electricity	kWh/1000 gal LNG	1,348.00	418.9

Do Not Print

Adjust results to 355 days of operation instead of 365, 88.75 Mgal/year inestead of 91.

0.97260274

Scenario A	Project			No Project			Project			No Project		
	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)	Fuel Throughput (MMBTU/year)	Loss Factor	GHG Emissions (MT CO2e/year)
Extraction, processing, and transmission to Sumas hub							**7,070,485**	**0.00%**	**57,931**	**727,762**	**0.00%**	**5,963**
Transmission from Sumas Hub to PSE gate							**7,067,158**	**0.05%**	**5,727**	**727,419**	**0.05%**	**589**
Distribution via PSE System							**7,060,450**	**0.092%**	**3,388**	**726,729**	**0.092%**	**349**
Liquefaction							**6,631,400**	**6.29%**	**35,792**	**0**	**0**	**0**
Direct Facility Emissions (includes Peak Shaving)	*6,818,200*		*34,485*	*0*		*0*	*6,631,400*	*0.00%*	*33,539*	*0*	*0*	*0*
Electricity Supply	*6,818,200*		*2,317*	*0*		*0*	*6,631,400*	*0.00%*	*2,253*	*0*	*0*	*0*
Vessel Loading of LNG							**5,904,671**	**0**	**14,100**	**0**	**0**	**0**
TOTE	*2,914,080*	*0.011%*	*174*	*0*		*0*	*2,834,242*	*0.011%*	*169*	*0*	*0*	*0*
Bunker Barge	*3,156,920*	*0.837%*	*14,323*	*0*		*0*	*3,070,429*	*0.814%*	*13,930*	*0*	*0*	*0*
Truck-to-Vessel	*0*	*0.220%*	*0*	*0*		*0*	*0*	*0.214%*	*0*	*0*	*0*	*0*
On-road Heavy-duty Truck Fuel							**0**	**0**	**0**	**0**	**0**	**0**
LNG (Plant-to-Tank Emissions)	*0*	*0.47%*	*0*	*0*		*0*	*0*	*0.46%*	*0*	*0*	*0*	*0*
LNG (Tank-to-Wheels Emissions)	*0*		*0*	*0*		*0*	*0*	*0.00%*	*0*	*0*	*0*	*0*
ULSD (Well-to-Wheels Emissions)	*0*		*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTE Vessel Operations							**2,918,948**	**0**	**228,907**	**5,837,897**	**0**	**330,827**
TOTE LNG (Direct Vessel Emissions)	*2,913,759*		*233,731*	*0*		*0*	*2,833,930*	*0*	*227,330*	*0*	*0*	*0*
TOTE Pilot Fuel Oil (Well-to-Tank Emissions)	*87,413*		*1,622*	*0*		*0*	*85,018*	*0*	*1,577*	*0*	*0*	*0*
TOTE Fuel Oil (Well-to-Tank Emissions)	*0*		*0*	*3,001,172*		*55,680*	*0*	*0*	*0*	*2,918,948*	*0*	*54,154*
TOTE Fuel Oil (Direct Vessel Emissions)	*0*		*0*	*3,001,172*		*284,466*	*0*	*0*	*0*	*2,918,948*	*0*	*276,672*
Other Vessel Operations							**3,136,086**	**0**	**245,935**	**3,136,086**	**0**	**355,437**
Other LNG (Direct Vessel Emissions)	*3,130,511*		*251,121*	*0*		*0*	*3,044,744*	*0*	*244,241*	*0*	*0*	*0*
Other Pilot Fuel Oil (Well-to-Tank Emissions)	*93,915*		*1,742*	*0*		*0*	*91,342*	*0*	*1,695*	*0*	*0*	*0*
Other Fuel Oil (Well-to-Tank Emissions)	*0*		*0*	*3,224,427*		*59,822*	*0*	*0*	*0*	*3,136,086*	*0*	*58,183*
Other Fuel Oil (Direct Vessel Emissions)	*0*		*0*	*3,224,427*		*305,627*	*0*	*0*	*0*	*3,136,086*	*0*	*297,254*
Total			**608,449**			**712,690**	**0**	**0**	**591,780**	**0**	**0**	**693,164**

Summary of Terminal Construction Emissions - GHG PSE LNG

Equipment (Direct + Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	1,807	0.1	0.01	1,814
1. Year - Road Vehicles/Commuting	3	0.0	0.00	3
1. Year - Fugitive Dust				0
1. Year - Total Emissions	1,811	0.1	0.01	1,817
2. Year - Construction Equipment	3,638	0.3	0.03	3,654
2. Year - Road Vehicles/Commuting	298	0.0	0.00	298
2. Year - Fugitive Dust				0
2. Year - Total Emissions	3,936	0.3	0.03	3,953
3. Year - Construction Equipment	2,838	0.2	0.03	2,852
3. Year - Road Vehicles/Commuting	404	0.0	0.00	405
3. Year - Fugitive Dust				0
3. Year - Total Emissions	3,242	0.2	0.03	3,257
4. Year - Construction Equipment	1,655	0.1	0.02	1,664
4. Year - Road Vehicles/Commuting	2	0.0	0.00	2
4. Year - Fugitive Dust				0
4. Year - Total Emissions	1,657	0.1	0.02	1,666
Project TOTAL:	**10,646**	**0.8**	**0.09**	**10,692**

Equipment (Direct)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	1,703	0.018	0.012	1,707
1. Year - Road Vehicles/Commuting	3	0.000	0.000	3
1. Year - Fugitive Dust				0
1. Year - Total Emissions	1,706	0.018	0.012	1,710
2. Year - Construction Equipment	3,417	0.049	0.030	3,427
2. Year - Road Vehicles/Commuting	227	0.002	0.001	227
2. Year - Fugitive Dust				0
2. Year - Total Emissions	3,643	0.051	0.030	3,654
3. Year - Construction Equipment	62	0.023	0.014	67
3. Year - Road Vehicles/Commuting	307	0.003	0.001	308
3. Year - Fugitive Dust				0
3. Year - Total Emissions	369	0.026	0.015	374
4. Year - Construction Equipment	1,545	0.028	0.017	1,550
4. Year - Road Vehicles/Commuting	2	0.000	0.000	2
4. Year - Fugitive Dust				0
4. Year - Total Emissions	1,546	0.028	0.017	1,552
Project TOTAL:	**7,265**	**0.123**	**0.074**	**7,289**

Equipment (Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	104	0.1	0.00	107
1. Year - Road Vehicles/Commuting	1	0.0	0.00	1
1. Year - Fugitive Dust				0
1. Year - Total Emissions	105	0.1	0.00	108
2. Year - Construction Equipment	221	0.2	0.00	228
2. Year - Road Vehicles/Commuting	72	0.0	0.00	72
2. Year - Fugitive Dust				0
2. Year - Total Emissions	293	0.2	0.00	299
3. Year - Construction Equipment	189	0.2	0.00	195
3. Year - Road Vehicles/Commuting	97	0.0	0.00	97
3. Year - Fugitive Dust				0
3. Year - Total Emissions	286	0.2	0.00	292
4. Year - Construction Equipment	110	0.1	0.00	113
4. Year - Road Vehicles/Commuting	0	0.0	0.00	0
4. Year - Fugitive Dust				0
4. Year - Total Emissions	111	0.1	0.00	114
Project TOTAL:	**795**	**0.6**	**0.00**	**812**

Operation hours per month	205.44

Construction Emission during 1. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)	Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
Upland Construction (demo, soil, utilities)																		Upstream Emission Diesel production				Total
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.600	0.664	624	630	0.740	0.450	20	0.0004	0.0002	20.3	82	1.7156	0.0017	0.00001	1.7624	22.0
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.491	0.188	530	531	0.740	0.450	60	0.0001	0.0001	59.9	28	0.5763	0.0006	0.00000	0.5920	60.5
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.491	0.188	530	531	0.740	0.450	72	0.0001	0.0001	71.8	28	0.5763	0.0006	0.00000	0.5920	72.4
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.733	0.255	590	594	0.740	0.450	23	0.0003	0.0002	22.8	67	1.3976	0.0014	0.00001	1.4358	24.2
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.733	0.255	590	594	0.740	0.450	27	0.0003	0.0002	26.8	67	1.3976	0.0014	0.00001	1.4358	28.2
Air Compressor	2	6	55	100%	43%	1.02	1.090	0.227	590	592	0.740	0.450	35	0.0019	0.0011	34.9	323	6.7564	0.0068	0.00005	6.9407	41.9
Cat Compactor	2	6	65	85%	59%	0.73	2.600	0.664	595	601	0.740	0.450	48	0.0011	0.0007	48.5	232	4.8487	0.0049	0.00003	4.9810	53.5
Cat D6 Dozer	2	6	65	85%	59%	0.49	2.663	0.309	595	600	0.740	0.450	48	0.0008	0.0005	48.4	155	3.2391	0.0033	0.00002	3.3275	51.7
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	2.090	0.216	536	540	0.740	0.450	167	0.0001	0.0001	166.9	23	0.4902	0.0005	0.00000	0.5035	167.4
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.274	0.141	536	537	0.740	0.450	167	0.0001	0.0001	166.9	23	0.4902	0.0005	0.00000	0.5035	167.4
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.519	0.150	536	537	0.740	0.450	66	0.0001	0.0001	66.4	18	0.3709	0.0004	0.00000	0.3811	66.8
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.535	0.284	595	600	0.740	0.450	19	0.0003	0.0002	18.6	103	2.1627	0.0022	0.00001	2.2217	20.8
Fuel Truck	2	6	200	85%	59%	0.11	0.519	0.150	536	537	0.740	0.450	133	0.0002	0.0001	132.9	35	0.7419	0.0007	0.00001	0.7621	133.7
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.700	0.924	693	705	0.740	0.450	31	0.0010	0.0006	31.2	205	4.2790	0.0043	0.00003	4.3958	35.6
Manlifts	1	6	50	85%	21%	3.66	6.316	1.643	691	706	0.740	0.450	8	0.0028	0.0017	8.4	580	12.1250	0.0122	0.00008	12.4559	20.8
In-water Construction																						
Forklift, 8,000 lbs	2	6	65	75%	59%	0.65	2.535	0.294	595	600	0.740	0.450	43	0.0009	0.0005	42.7	207	4.3254	0.0044	0.00003	4.4434	47.2
Air Compressor	4	6	55	100%	43%	1.02	1.090	0.181	590	592	0.740	0.450	69	0.0037	0.0023	69.8	646	13.5127	0.0136	0.00009	13.8814	83.7
Crane, 60 ton	3	6	290	85%	43%	0.17	0.491	0.098	530	531	0.740	0.450	208	0.0004	0.0002	208.2	83	1.7288	0.0017	0.00001	1.7760	210.0
Crew Truck, 3/4 ton	3	6	250	25%	59%	0.07	2.090	0.219	536	540	0.740	0.450	74	0.0001	0.0000	73.6	35	0.7353	0.0007	0.00001	0.7553	74.4
Diesel Pile Driver Hammer	3	6	85	85%	59%	0.73	2.663	0.327	595	600	0.740	0.450	95	0.0017	0.0010	95.0	348	7.2730	0.0073	0.00005	7.4715	102.4
Flatbed Truck (Matl. Handling)	3	6	200	85%	59%	0.11	0.519	0.121	536	537	0.740	0.450	199	0.0003	0.0002	199.3	53	1.1128	0.0011	0.00001	1.1432	200.4
Fuel Truck	2	6	200	25%	59%	0.11	0.519	0.121	536	537	0.740	0.450	39	0.0001	0.0000	39.1	35	0.7419	0.0007	0.00001	0.7621	39.8
Loader, Cat 966, 4 cy	2	6	100	75%	21%	0.65	5.700	0.832	693	705	0.740	0.450	27	0.0009	0.0005	27.5	205	4.2790	0.0043	0.00003	4.3958	31.9
Personnel Work Boat	1	4.99	30	75%	45%	3.90	3.728	0.298	515	521	0.020	0.090	5	0.0001	0.0003	5.5	513	10.7362	0.0108	0.00007	11.0291	16.5
Tug/Work Barge w/crane	1	1.04	500	85%	45%	31.80	3.728	0.224	515	521	0.020	0.090	21	0.0001	0.0005	21.5	876	18.3325	0.0185	0.00013	18.8328	40.4
												Annual Tot	1,703	0.0178	0.0115	1707.1	4969	103.9	0.1	0.0	106.8	1,813.9

Construction Emission during 2. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO_2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)	Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total C02e (tonne/ year)
Upland Construction (demo, soil, utilities)																						
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.330	0.606	625	631	0.740	0.450	20.2	0.0004	0.0002	20.3	82	1.7222	0.0017	0.00001	1.7692	22.0
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.429	0.175	530	531	0.740	0.450	59.8	0.0001	0.0001	59.9	27	0.5630	0.0006	0.00000	0.5784	60.4
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.429	0.175	530	531	0.740	0.450	71.8	0.0001	0.0001	71.8	27	0.5630	0.0006	0.00000	0.5784	72.4
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.542	0.230	590	593	0.740	0.450	22.7	0.0003	0.0002	22.8	66	1.3910	0.0014	0.00001	1.4290	24.2
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.542	0.230	590	593	0.740	0.450	26.7	0.0003	0.0002	26.8	66	1.3910	0.0014	0.00001	1.4290	28.2
Air Compressor	2	6	55	100%	43%	1.02	0.908	0.207	590	592	0.740	0.450	34.5	0.0019	0.0011	34.9	323	6.7564	0.0068	0.00005	6.9407	41.8
Cat Compactor	2	6	65	85%	59%	0.73	2.408	0.280	595	600	0.740	0.450	48.2	0.0011	0.0007	48.4	231	4.8354	0.0049	0.00003	4.9674	53.4
Cat D6 Dozer	2	6	65	85%	59%	0.49	1.769	0.192	596	599	0.740	0.450	48.2	0.0008	0.0005	48.3	155	3.2457	0.0033	0.00002	3.3343	51.7
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	0.203	0.137	536	537	0.740	0.450	165.9	0.0001	0.0001	165.9	22	0.4637	0.0005	0.00000	0.4763	166.4
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.203	0.137	536	537	0.740	0.450	166.9	0.0001	0.0001	166.9	22	0.4637	0.0005	0.00000	0.4763	167.4
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.322	0.141	536	537	0.740	0.450	66.4	0.0001	0.0001	66.4	17	0.3643	0.0004	0.00000	0.3743	66.8
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.265	0.257	595	599	0.740	0.450	18.5	0.0003	0.0002	18.6	103	2.1528	0.0022	0.00001	2.2115	20.8
Fuel Truck	2	6	200	85%	59%	0.11	0.322	0.141	536	537	0.740	0.450	132.8	0.0002	0.0001	132.8	35	0.7286	0.0007	0.00001	0.7485	133.6
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.288	0.839	693	704	0.740	0.450	31.0	0.0010	0.0006	31.2	206	4.3055	0.0043	0.00003	4.4230	35.6
Manlifts	1	6	50	85%	21%	3.66	5.873	1.516	691	705	0.740	0.450	7.8	0.0028	0.0017	8.3	579	12.1217	0.0122	0.00008	12.4525	20.8
In-water Construction																						
Forklift, 8,000 lbs	2	1	65	75%	59%	0.65	2.265	0.257	595	599	0.740	0.450	7.1	0.0001	0.0001	7.1	34	0.7176	0.0007	0.00000	0.7372	7.9
Air Compressor	4	1	55	100%	43%	1.02	0.908	0.207	590	592	0.740	0.450	11.5	0.0006	0.0004	11.6	108	2.2521	0.0023	0.00002	2.3136	13.9
Crane, 60 ton	3	1	290	85%	43%	0.17	0.429	0.175	530	531	0.740	0.450	34.7	0.0001	0.0000	34.7	13	0.2815	0.0003	0.00000	0.2892	35.0
Crew Truck, 3/4 ton	3	1	250	25%	59%	0.07	0.203	0.137	536	537	0.740	0.450	12.2	0.0000	0.0000	12.2	6	0.1159	0.0001	0.00000	0.1191	12.3
Diesel Pile Driver Hammer	3	1	85	85%	59%	0.73	2.408	0.280	595	600	0.740	0.450	15.8	0.0003	0.0002	15.8	58	1.2089	0.0012	0.00001	1.2418	17.1
Flatbed Truck (Matl. Handling)	3	1	200	85%	59%	0.11	0.322	0.141	536	537	0.740	0.450	33.2	0.0000	0.0000	33.2	9	0.1822	0.0002	0.00000	0.1871	33.4
Fuel Truck	2	1	200	25%	59%	0.11	0.322	0.141	536	537	0.740	0.450	6.5	0.0000	0.0000	6.5	6	0.1214	0.0001	0.00000	0.1248	6.6
Loader, Cat 966, 4 cy	2	1	100	75%	21%	0.65	5.288	0.839	693	704	0.740	0.450	4.6	0.0001	0.0001	4.6	34	0.7176	0.0007	0.00000	0.7372	5.3
Personnel Work Boat	1	1	30	75%	45%	3.90	3.728	0.224	515	521	0.020	0.090	1.1	0.0000	0.0001	1.1	103	2.1528	0.0022	0.00001	2.2115	3.3
Tug/Work Barge w/crane	1	1	250	85%	45%	15.90	3.728	0.224	515	521	0.020	0.090	10.2	0.0001	0.0002	10.3	420	8.7767	0.0089	0.00006	9.0161	19.3
LNG Facility Construction (including Storage Tank)																						
Cat 345 Backhoe 4 cy	1	7	165	85%	21%	0.52	2.330	0.606	625	631	0.740	0.450	26.7	0.0005	0.0003	26.8	96	2.0092	0.0020	0.00001	2.0641	28.9
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.429	0.175	530	531	0.740	0.450	139.6	0.0003	0.0002	139.7	63	1.3137	0.0013	0.00001	1.3496	141.0
200 Ton Crawler Crane	3	7	300	85%	43%	0.17	0.429	0.175	530	531	0.740	0.450	251.3	0.0005	0.0003	251.4	94	1.9706	0.0020	0.00001	2.0244	253.4
22 Ton Hydrocrane	4	7	85	85%	43%	0.42	1.542	0.230	590	593	0.740	0.450	106.0	0.0015	0.0009	106.3	310	6.4914	0.0066	0.00004	6.6685	113.0
30 Ton Hydrocrane	3	7	100	85%	43%	0.42	1.542	0.230	590	593	0.740	0.450	93.5	0.0011	0.0007	93.8	233	4.8686	0.0049	0.00003	5.0014	98.8
Air Compressor	4	7	55	85%	43%	1.02	0.908	0.207	590	592	0.740	0.450	68.5	0.0037	0.0022	69.2	754	15.7649	0.0159	0.00011	16.1950	85.4
Cat Compactor	3	7	65	85%	59%	0.73	2.408	0.280	595	600	0.740	0.450	84.3	0.0020	0.0012	84.7	405	8.4620	0.0085	0.00006	8.6929	93.4
Cat D6 Dozer	3	7	65	85%	59%	0.49	1.769	0.192	596	599	0.740	0.450	84.3	0.0013	0.0008	84.6	272	5.6800	0.0057	0.00004	5.8350	90.4
Concrete Pump	3	7	150	85%	43%	1.06	2.355	0.473	589	594	0.74	0.450	140.5	0.0029	0.0017	141.1	587	12.2873	0.0124	0.00008	12.6226	153.8
Crane, 60 ton	1	7	290	50%	43%	0.17	0.429	0.175	530	531	0.740	0.450	47.6	0.0001	0.0001	47.7	31	0.6569	0.0007	0.00000	0.6748	48.3
Crew Truck, 3/4 ton	6	7	250	85%	59%	0.07	0.203	0.137	536	537	0.740	0.450	580.6	0.0004	0.0002	580.7	78	1.6229	0.0016	0.00001	1.6671	582.4
Dump Trucks 15 cy	1	7	285	75%	59%	0.07	0.203	0.137	536	537	0.740	0.450	97.3	0.0001	0.0000	97.4	13	0.2705	0.0003	0.00000	0.2779	97.6
Flatbed Truck (Matl. Handling)	3	7	200	85%	59%	0.11	0.322	0.141	536	537	0.740	0.450	232.3	0.0003	0.0002	232.4	61	1.2751	0.0013	0.00001	1.3099	233.7
Forklift, 8,000 lbs	3	7	85	50%	59%	0.65	2.265	0.257	595	599	0.740	0.450	64.8	0.0010	0.0006	65.1	360	7.5347	0.0076	0.00005	7.7403	72.8
Fuel Truck	3	7	200	85%	59%	0.11	0.322	0.141	536	537	0.740	0.450	232.3	0.0003	0.0002	232.4	61	1.2751	0.0013	0.00001	1.3099	233.7
Loader, Cat 966, 4 cy	3	7	100	85%	21%	0.65	5.288	0.839	693	704	0.740	0.450	54.2	0.0018	0.0011	54.6	360	7.5347	0.0076	0.00005	7.7403	62.3
Manlifts	6	7	50	85%	21%	3.66	5.873	1.516	691	705	0.740	0.450	54.3	0.0199	0.0121	58.4	4.056	84.8520	0.0856	0.00058	87.1673	145.6
												Annual Tot	3,417	0.0486	0.0298	3427	10587.4376	221.4642	0.2235	0.0015	227.5070	3,654

Construction Emission during 3. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)	Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																						
100 Ton Crawler Crane	2	12	250	85%	43%	0.17	0.371	0.166	531	532	0.740	0.450	240	0.0005	0.0003	239.8	110	2.3051	0.0023	0.00002	2.3680	242.2
200 Ton Crawler Crane	2	12	300	85%	43%	0.17	0.371	0.166	531	532	0.740	0.450	288	0.0005	0.0003	287.8	110	2.3051	0.0023	0.00002	2.3680	290.2
22 Ton Hydrocrane	3	12	85	85%	43%	0.42	1.359	0.208	590	593	0.740	0.450	136	0.0020	0.0012	136.6	401	8.3858	0.0085	0.00006	8.6147	145.2
30 Ton Hydrocrane	2	12	100	85%	43%	0.42	1.359	0.208	590	593	0.740	0.450	107	0.0013	0.0008	107.1	267	5.5906	0.0056	0.00004	5.7431	112.8
Air Compressor	3	12	55	85%	43%	1.02	0.734	0.189	590	592	0.740	0.450	88	0.0047	0.0029	89.0	969	20.2691	0.0205	0.00014	20.8222	109.8
Cat Compactor	2	12	65	85%	59%	0.73	2.163	0.254	595	599	0.740	0.450	96	0.0023	0.0014	96.8	464	9.6974	0.0098	0.00007	9.9620	106.7
Cat D6 Dozer	2	12	65	85%	59%	0.49	1.503	0.177	596	599	0.740	0.450	96	0.0015	0.0009	96.6	310	6.4782	0.0065	0.00004	6.6549	103.2
Concrete Pump	2	12	150	85%	43%	1.06	2.214	0.445	589	594	0.740	0.450	161	0.0033	0.0020	161.2	670	14.0161	0.0141	0.00010	14.3986	175.6
Crane, 60 ton	1	12	290	50%	43%	0.17	0.371	0.166	531	532	0.740	0.450	82	0.0002	0.0001	81.8	55	1.1526	0.0012	0.00001	1.1840	83.0
Crew Truck, 3/4 ton	4	12	250	85%	59%	0.07	0.163	0.135	536	537	0.740	0.450	664	0.0005	0.0003	663.6	94	1.9607	0.0020	0.00001	2.0142	665.6
Flatbed Truck (Matl. Handling)	2	12	200	85%	59%	0.11	0.239	0.137	536	537	0.740	0.450	265	0.0003	0.0002	265.5	71	1.4838	0.0015	0.00001	1.5242	267.1
Forklift, 8,000 lbs	2	12	85	25%	59%	0.65	2.007	0.233	595	599	0.740	0.450	37	0.0006	0.0004	37.1	414	8.6508	0.0087	0.00006	8.8868	46.0
Fuel Truck	2	12	200	85%	59%	0.11	0.239	0.137	536	537	0.740	0.450	265	0.0003	0.0002	265.5	71	1.4838	0.0015	0.00001	1.5242	267.1
Loader, Cat 966, 4 cy	2	12	100	85%	21%	0.65	4.895	0.759	694	704	0.740	0.450	62	0.0020	0.0012	62.4	409	8.5581	0.0086	0.00006	8.7916	71.2
Manlifts	4	12	50	85%	21%	3.66	5.441	1.393	692	705	0.740	0.450	62	0.0227	0.0138	66.7	4,637	97.0002	0.0979	0.00067	99.6470	166.4
												Annual Tot	2,649	0.0428	0.0260	2,658	9,052	189	0	0	195	2,852

Construction Emission during 4. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)	Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																						
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.317	0.159	531	532	0.740	0.450	140	0.0004	0.0002	139.9	64	1.3446	0.0014	0.00001	1.3813	141.3
200 Ton Crawler Crane	2	7	300	85%	43%	0.17	0.317	0.159	531	532	0.740	0.450	168	0.0004	0.0002	167.8	64	1.3446	0.0014	0.00001	1.3813	169.2
22 Ton Hydrocrane	3	7	85	85%	43%	0.42	1.183	0.188	590	592	0.740	0.450	79	0.0013	0.0008	79.7	234	4.8917	0.0049	0.00003	5.0252	84.7
30 Ton Hydrocrane	2	7	100	85%	43%	0.42	1.183	0.188	590	592	0.740	0.450	62	0.0008	0.0005	62.5	156	3.2612	0.0033	0.00002	3.3501	65.8
Air Compressor	3	7	55	85%	43%	1.02	0.572	0.172	590	591	0.740	0.450	51	0.0031	0.0019	51.9	565	11.8236	0.0119	0.00008	12.1463	64.1
Cat Compactor	2	7	65	85%	59%	0.73	1.930	0.232	595	599	0.740	0.450	56	0.0015	0.0009	56.4	270	5.6568	0.0057	0.00004	5.8112	62.3
Cat D6 Dozer	2	7	65	85%	59%	0.49	1.257	0.164	596	598	0.740	0.450	56	0.0010	0.0006	56.3	181	3.7789	0.0038	0.00003	3.8820	60.2
Concrete Pump	2	7	150	85%	43%	1.06	2.078	0.417	589	594	0.740	0.450	94	0.0021	0.0013	94.0	391	8.1761	0.0083	0.00006	8.3992	102.4
Crane, 60 ton	1	7	290	50%	43%	0.17	0.317	0.159	531	532	0.740	0.450	48	0.0001	0.0001	47.7	32	0.6723	0.0007	0.00000	0.6907	48.4
Crew Truck, 3/4 ton	4	7	250	85%	59%	0.07	0.139	0.133	536	537	0.740	0.450	387	0.0003	0.0002	387.1	55	1.1437	0.0012	0.00001	1.1749	388.3
Flatbed Truck (Matl. Handling)	2	7	200	85%	59%	0.11	0.192	0.134	536	537	0.740	0.450	155	0.0002	0.0001	154.9	41	0.8655	0.0009	0.00001	0.8891	155.8
Forklift, 8,000 lbs	2	7	85	25%	59%	0.65	1.762	0.211	595	598	0.740	0.450	22	0.0004	0.0002	21.7	241	5.0463	0.0051	0.00003	5.1840	26.8
Fuel Truck	2	7	200	85%	59%	0.11	0.192	0.134	536	537	0.740	0.450	155	0.0002	0.0001	154.9	41	0.8655	0.0009	0.00001	0.8891	155.8
Loader, Cat 966, 4 cy	2	7	100	85%	21%	0.65	4.557	0.694	694	703	0.740	0.450	36	0.0013	0.0008	36.4	239	4.9922	0.0050	0.00003	5.1284	41.5
Manlifts	4	7	50	85%	21%	3.66	5.021	1.273	692	704	0.740	0.450	36	0.0150	0.0089	39.2	2,705	56.5835	0.0571	0.00039	58.1274	97.3
												Annual Tot	1,545	0.0280	0.0168	1,550	5,280	110	0	0	113	1,664

Notes:
- Assume 48 hours per week; 4.28 weeks per month 205 hrs/month
- Emission factors for CO, VOC, and CO2 are average NONROAD emission rates for the State of Washington.
- Emission factors for CH4 and N2O are from the Climate Registry 2014 Default Emission Factors, Table 13.7.
- Tugboat, Workboat, and Personnel Boat Emissions factors from U.S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report April 2009, Table 3-8: Harbor Craft Emission Factors (g/kWh)

Road Vehicle Terminal Construction Criteria Pollutant Emissions
PSE LNG

Construction Vehicle Emissions - Winter 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	311.0	0.0	0.0	2.83	0.0	316	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		38	1942.0	0.0	0.0	3.11	0.5	1,949	0.074	0.000	0.000	0.07	0.949	0.02300	0.00000	0.00000	0.02300	0.09710
								Total	0.074	0.000	0.000	0.074	0.949	0.023	0.000	0.000	0.023	0.097

Construction Vehicle Emissions - Summer 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	325.2	0.0	0.0	1.83	0.0	328	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		1,225	2017.0	0.0	0.0	3.11	0.5	2,024	2.5	0.000	0.000	2.48	31.756	0.77011	0.00000	0.00000	0.77011	3.25051
								Total	2.5	0.000	0.000	2.48	31.756	0.770	0.000	0.000	0.770	3.251
								Annual Total	**2.6**	**0.0**	**0.0**	**2.6**	**32.7**	**0.8**	**0.0**	**0.0**	**0.8**	**3.3**

Construction Vehicle Emissions - Winter 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers	Seattle-Tacoma	309,120	306.0	0.0	0.0	2.68	0.0	310	95.9	0.001	0.000	96.03	1250.964	30.33651	0.00000	0.00000	30.33651	126.37105
Heavy Duty Delivery Trucks		9,999	1942.0	0.0	0.0	2.86	0.5	1,948	19.5	0.000	0.000	19.49	249.548	6.05165	0.00000	0.00000	6.05165	25.54304
								Total	115.4	0.001	0.000	115.53	1500.512	36.388	0.000	0.000	36.388	151.914

Construction Vehicle Emissions - Summer 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	309,120	319.3	0.0	0.0	1.70	0.0	322	99.6	0.001	0.000	99.68	1298.405	31.48698	0.00000	0.00000	31.48698	131.16349
Heavy Duty Delivery Trucks		5,789	2018.0	0.0	0.0	2.86	0.5	2,024	11.7	0.000	0.000	11.72	150.110	3.64025	0.00000	0.00000	3.64025	15.36491
								Total	111.3	0.001	0.000	111.40	1448.515	35.127	0.000	0.000	35.127	146.528
								Annual Total	**226.7**	**0.0**	**0.0**	**226.9**	**2949.0**	**71.5**	**0.0**	**0.0**	**71.5**	**298.4**

Construction Vehicle Emissions - Winter 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	302,400	300.0	0.0	0.0	2.56	0.0	304	92.0	0.001	0.000	92.07	1199.349	29.08482	0.00000	0.00000	29.08482	121.15696
Heavy Duty Delivery Trucks		6,356	1942.0	0.0	0.0	2.62	0.4	1,947	12.4	0.000	0.000	12.39	158.591	3.84592	0.00000	0.00000	3.84592	16.23300
								Total	104.3	0.001	0.000	104.46	1357.940	32.931	0.000	0.000	32.931	137.390

Construction Vehicle Emissions - Summer 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	614,880	313.8	0.0	0.0	1.59	0.0	316	194.5	0.002	0.001	194.76	2536.972	61.52286	0.00000	0.00000	61.52286	256.28219
Heavy Duty Delivery Trucks		4,160	2018.0	0.0	0.0	2.62	0.4	2,023	8.4	0.000	0.000	8.42	107.846	2.61531	0.00000	0.00000	2.61531	11.03881
								Total	202.9	0.002	0.001	203.18	2644.818	64.138	0.000	0.000	64.138	267.321
								Annual Total	**307.3**	**0.0**	**0.0**	**307.6**	**4002.8**	**97.1**	**0.0**	**0.0**	**97.1**	**404.7**

Construction Vehicle Emissions - Winter 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	295.0	0.0	0.0	2.46	0.0	299	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		457	1942.0	0.0	0.0	2.38	0.4	1,947	0.9	0.000	0.000	0.89	11.400	0.27646	0.00000	0.00000	0.27646	1.16689
								Total	0.9	0.000	0.000	0.89	11.400	0.276	0.000	0.000	0.276	1.167

Construction Vehicle Emissions - Summer 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2e (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	308.5	0.0	0.0	1.51	0.0	311	0.0	0.000	0.000	0.00	0.000	0.00000	0.00000	0.00000	0.00000	0.00000
Heavy Duty Delivery Trucks		306	2019.0	0.0	0.0	2.38	0.4	2,024	0.6	0.000	0.000	0.62	7.935	0.19243	0.00000	0.00000	0.19243	0.81221
								Total	0.6	0.000	0.000	0.62	7.935	0.192	0.000	0.000	0.192	0.812
								Annual Total	**1.5**	**0.0**	**0.0**	**1.5**	**19.3**	**0.5**	**0.0**	**0.0**	**0.5**	**2.0**

Notes:
EFs from EPA MOVES model.
Construction Worker vehicles assumed to be ID 21 - Passenger Car. Heavy-Duty Delivery trucks assumed to be 61 - Combination Short-haul truck.
Assume 48 hours per week; 4.28 weeks per month

Month/Year	Season	# of work days/ month	# of Cars/day	# of cars/ month	Car VMT/ month	# of Trucks/ month	Truck VMT/ month	Total On-Site VMT/ month (Car and Truck)
Jan-1. Year		26.6	0	0	0	0.00	0	0
Feb-1. Year	Winter 1. Year	24	0	0	0	0.00	0	0
Mar-1. Year		26.6	0	0	0	0.00	0	0
Apr-1. Year		25.7	0	0	0	0.00	0	0
May-1. Year		26.6	0	0	0	0.00	0	0
Jun-1. Year		25.7	0	0	0	85.00	331	331
Jul-1. Year	Summer 1. Year	26.6	0	0	0	85.00	320	320
Aug-1. Year		26.6	0	0	0	75.00	282	282
Sep-1. Year		25.7	0	0	0	75.00	292	292
Oct-1. Year		26.6	0	0	0	5.00	19	19
Nov-1. Year	Winter 1. Year	25.7	0	0	0	5.00	19	19
Dec-1. Year		26.6	0	0	0	0.00	0	0
Jan-2. Year		26.6	0	0	0	0.00	0	0
Feb-2. Year	Winter 2. Year	24.9	0	0	0	0.00	0	0
Mar-2. Year		26.6	0	0	0	0.00	0	0
Apr-2. Year		25.7	0	0	0	0.00	0	0
May-2. Year		26.6	0	0	0	0.00	0	0
Jun-2. Year		25.7	0	0	0	174.00	677	677
Jul-2. Year	Summer 2. Year	26.6	98	2,604	104,160	244.00	918	105,078
Aug-2. Year		26.6	98	2,604	104,160	294.00	1,106	105,266
Sep-2. Year		25.7	98	2,520	100,800	794.00	3,088	103,888
Oct-2. Year		26.6	98	2,604	104,160	844.00	3,176	107,336
Nov-2. Year	Winter 2. Year	25.7	98	2,520	100,800	894.00	3,477	104,277
Dec-2. Year		26.6	98	2,604	104,160	889.00	3,346	107,506
Jan-3. Year		26.6	98	2,604	104,160	888.00	3,342	107,502
Feb-3. Year	Winter 3. Year	24	98	2,352	94,080	329.00	1,371	95,451
Mar-3. Year		26.6	98	2,604	104,160	279.00	1,050	105,210
Apr-3. Year		25.7	98	2,520	100,800	279.00	1,085	101,885
May-3. Year		26.6	98	2,604	104,160	252.00	948	105,108
Jun-3. Year		25.7	98	2,520	100,800	189.00	735	101,535
Jul-3. Year	Summer 3. Year	26.6	98	2,604	104,160	139.00	523	104,683
Aug-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Sep-3. Year		25.7	98	2,520	100,800	89.00	346	101,146
Oct-3. Year		26.6	0	0	0	78.00	294	294
Nov-3. Year	Winter 3. Year	25.7	0	0	0	39.00	152	152
Dec-3. Year		26.6	0	0	0	39.00	147	147
Jan-4. Year		26.6	0	0	0	39.00	147	147
Feb-4. Year	Winter 4. Year	24	0	0	0	39.00	163	163
Mar-4. Year		26.6	0	0	0	39.00	147	147
Apr-4. Year		25.7	0	0	0	41.00	159	159
May-4. Year		26.6	0	0	0	39.00	147	147
Jun-4. Year		25.7	0	0	0	0.00	0	0
Jul-4. Year	Summer 4. Year	26.6	0	0	0	0.00	0	0
Aug-4. Year		26.6	0	0	0	0.00	0	0
Sep-4. Year		25.7	0	0	0	0.00	0	0
Oct-4. Year		26.6	0	0	0	0.00	0	0
Nov-4. Year	Winter 4. Year	25.7	0	0	0	0.00	0	0
Dec-4. Year		26.6	0	0	0	0.00	0	0
Total					1,535,520		28,330	

Note: Commute round-trip distance was assumed

Cars VMT round trip	40	mi/day
Truck VMT round trip	100	mi/day

Summary VMTs		Car VMT/ month	Truck VMT/ month
1.Year	Winter	0	38.00
	Summer	0	1225.00
2.Year	Winter	309,120	9999.00
	Summer	309,120	5789.00
3.Year	Winter	302,400	6356.00
	Summer	614,880	4160.00
4.Year	Winter	0	457.00
	Summer	0	306.00
Total		**1,535,520**	**28330.00**

Construction Material & Power- UPSTREAM Emissions -

Input	tonnes	Source
Steel	4,745	Response Tacoma LNG Supplementary SEIS Questions, July 07, 2018, page 5
Rebar	1666.0	
Stainless Steel	290.0	
Copper	26	
Asphalt	7570.0	
Paint	5.0	
Aggregate	80110.0	
Cement	1716.0	

Pollutant	CO_2	CH_4	N_2O	CO_2e	Source
Life Cycle Emission Factor (g/kg)					
Structural Steel	2,687	4.3	0.0	2,802	GREET2_2017
Rebar	2,020	3.5	0.0	2,115	GREET2_2017
Stainless Steel	5,204	11.3	0.1	5,512	GREET2_2017
Copper	3,083	6.31	0.1	3,257	GREET2_2017
Asphalt	639	0.42	0.0	651	GREET1_2017
Aggregate	300	0.20	0.0	305	GREET1_2017
Cement	2,900	0.70	0.0	2,918	GREET1_2017
Emissions (tonne)					
Structural Steel	12,748	20.6	0.10	13,293	
Rebar	3,366	5.9	0.04	3,524	
Stainless Steel	1,509	3.3	0.03	1,598	
Copper	80.2	0.2	0.00	84.7	
Asphalt	4,841	3.2	0.02	4,927	
Aggregate	24,033	16.0	0.00	24,434	
Cement	4,976	1.2	0.00	5,007	
Total	**51,553**	**50.3**	**0.19**	**52,869**	

Total power consumption during construction

Consumption	10,512,000	kWh

Source : Response Tacoma LNG Supplementary SEIS Questions, july 07, 2018, page 5

Upstream Emissions Power (see sheet Upstream, B40)

Gig Harbor Peak Shaving

General inputs		
Total LNG delivery to Gig Harbor per year	1,775,000	gal
Truck capacity	10,000	gal
Number of trips	177.5	

Calculation of Annual Diesel Truck Consumption	LNG Project	No project	
Distance to gig harbor	17	175	miles/trip
Annual miles for delivery	3,018	31,063	miles/year
Diesel consumption per mile	**17,738**	**17,738**	**Btu/mile**
Total Diesel Consumption	**53.52**	**550.99**	**mmBtu/year**

Processing Step	Diesel Consumption mmBtu/year	Emissions (t/year)			
		CO_2	CH_4	N_2O	CO_{2e}
LNG Project	53.5	4.18	0.00023	0.00003	4.2
No project	550.99	43.08	0.00262	0.00010	43.2

On-road trucking

Annual Fuel delivery to tractors		Consumption	
	Equipment	Mgal/year	GBtu/year
LNG	Tractor engine	3.55	274
Diesel	Tractor engine	1.93	247

				Emissions (g/MMBTU)				Old value from BID
Pathway Component	**VOC**	**CO**	**NO_x**	**CH_4**	**N_2O**	**CO_2**	**CO_{2C}**	**CO_{2C}**
Tank-to-Wheels LNG Combination Tractor	21.07	1,167	66.09	309.766737	0.03250653	55,559	57,459	57,458
Total LNG Tacoma -to-Wheels	**21.07**	**1,167**	**66.09**	**309.8**	**0.03**	**55,559**	**57,459**	**57,458**
Well-to-Wheels Diesel Combination Tractor	**31.52**	**94.58**	**228.4**	**4.75**	**0.18**	77,938	**78,186**	**78,185**
Plant-to-Tank LNG Combination Tractor	0.308	1.289	7.299	104.5	0.017	753	756	756

	Consumption	Emissions (t/year)			
Processing Step	**mmBtu/year**	**CO_2C**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project - LNG Tractor	273,902	15,738	84.85	0.01	17,862
Diesel tractor	246,512	19,274	1.17	0.04	19,316

Ship Emissions and Fuel Consumption Estimates

Source: 2018-05-25 PSE Submittal page 79, tables TOTE Vessel Emissions

Route Definition

Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	*Time within 200 nm* Transit	Maneuvering	Hotelling
Roflo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Use of extra pilot fuel for LNG Marine vessel 3%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
					Low Pressure DF LNG	Low Pressure DF LNG	
24	25.5	52200	400	720	All	All	LNG Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	LNG	LNG
Maneuvering	2.0	1,044	396	148	LNG	LNG
Hotelling	20.0	0	229	259	LNG	LNG

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	0.58	0.00	0.58	0.00	0.01	0.01	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	0.60	0.00	0.60	0.00	0.01	0.01	0.00
Emissions Rate (g/tonne MGOe)	9,376	6	9,456	17	106	105	0
Emissions Rate (g/mmBtu MGOe, LHV)	251	0	253	0	3	3	0

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	3.62	0.00	3.62	0.01	0.04	0.04	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	3.64	0.00	3.64	0.01	0.04	0.04	0.00
Emissions Rate (g/tonne MGOe)	9,310	3	9,323	17	99	99	0
Emissions Rate (g/mmBtu MGOe, LHV)	249	0	249	0	3	3	0

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	4.20	0.00	4.20	0.01	0.04	0.04	0.00
	0.02	0.00	0.04	0.00	0.00	0.00	0.00
	0.02	0.00	0.01	0.00	0.00	0.00	0.00
Total Emissions (tonne)	4.24	0.00	4.25	0.01	0.05	0.05	0.00
Emissions Rate (g/tonne MGOe)	9,320	3	9,342	17	100	100	0
Emissions Rate (g/mmBtu MGOe, LHV)	230	0	230	0	2	2	0

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	135	0.01	1.62	136	179
	1	0.00	0.01	1	1
	3	0.00	0.01	3	3
Total Emissions (tonne)	139	0.01	1.64	140	183
Emissions Rate (g/tonne MGOe)	2,172,237	153	25,601	307,200	403,493
Emissions Rate (g/mmBtu MGOe, LHV)	58,070	4	684	58,467	76,794

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	846	0.06	10.10	851	1,121
	1	0.00	0.01	1	1
	3	0.00	0.01	3	3
Total Emissions (tonne)	849	0.06	10.12	855	1,126
Emissions Rate (g/tonne MGOe)	2,172,639	152	25,881	1,880,069	2,475,106
Emissions Rate (g/mmBtu MGOe, LHV)	58,080	4	692	58,472	76,979

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e	BC	OC	Methane Slip
	981	0.07	11.71	988	1,301	0.01	0.00	0.43%
	1	0.00	0.02	2	2	0.00	0.00	0.36%
	5	0.00	0.02	5	6	0.00	0.00	0.16%
Total Emissions (tonne)	988	0.07	11.75	995	1,309	0.01	0.02	
Emissions Rate (g/tonne MGOe)	2,172,582	152	25,841	2,187,269	2,878,599	22	46	
Emissions Rate (g/mmBtu MGOe, LHV)	53,552	4	637	53,914	70,955	1	1	

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Boiler
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8
Fuel Consumed (MT MGOe)	450.1	3.0	1.6

Within 200nm								Emissions Factors (g/kWh)		
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Outside 200nm								Emissions Factors (g/kWh)		
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Ship Emissions and Fuel Consumption Estimates

Route Definition

									Time within 200 nm		
Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	Transit	Maneuvering	Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
24	25.5	52200	400	720	Medium speed diesel 2000 - 2010	Medium speed diesel 2000 - 2010	Fuel Oil Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	MGO (0.1	MGO (0.1% S)
Maneuvering	2.0	1,044	396	148	MGO (0.1	MGO (0.1% S)
Hotelling	20.0	0	229	259	MGO (0.1	MGO (0.1% S)

Emissions Calcs

Emissions Within 200nm (tonne per trip)							
End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	3.72	0.15	0.34	0.13	0.07	0.07	0.07
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	3.82	0.16	0.35	0.15	0.08	0.07	0.08
Emissions Rate (g/tonne MGO)	59,739	2,578	5,478	2,287	1,191	1,141	1,184
Emissions Rate (g/mmBtu MGO, LHV)	1,597	69	146	61	32	31	32

Emissions Within 200nm (tonne per trip)					
End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	198	0.01	0.00	199	201
	1	0.00	0.00	1	1
	4	0.00	0.00	4	4
Total Emissions (tonne)	203	0.01	0.00	204	207
Emissions Rate (g/tonne MGO)	3,171,667	153	48	447,826	454,393
Emissions Rate (g/mmBtu MGO, LHV)	84,787	4	1	11,972	12,147

Emissions Outside 200nm (tonne per trip)							
End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	23.24	0.95	2.10	0.80	0.46	0.44	0.46
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	23.34	0.96	2.11	0.82	0.46	0.44	0.46
Emissions Rate (g/tonne MGO)	59,707	2,467	5,398	2,093	1,177	1,128	1,176
Emissions Rate (g/mmBtu MGO, LHV)	1,596	66	144	56	31	30	31

Emissions Outside 200nm (tonne per trip)					
End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	1,235	0.06	0.02	1,241	1,259
	1	0.00	0.00	1	1
	4	0.00	0.00	4	4
Total Emissions (tonne)	1,240	0.06	0.02	1,246	1,264
Emissions Rate (g/tonne MGO)	3,171,667	152	49	2,740,069	2,780,013
Emissions Rate (g/mmBtu MGO, LHV)	84,787	4	1	73,249	74,317

Total Emissions (tonne per trip)							
End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	26.96	1.10	2.43	0.93	0.53	0.51	0.53
	0.13	0.02	0.02	0.00	0.00	0.00	0.00
	0.07	0.00	0.01	0.03	0.00	0.0018	0.00
Total Emissions (tonne)	27.15	1.13	2.46	0.96	0.54	0.51	0.54
Emissions Rate (g/tonne MGO)	59,711	2,482	5,410	2,121	1,179	1,130	1,177
Emissions Rate (g/mmBtu MGO, LHV)	1,472	61	133	52	29	28	29

Total Emissions (tonne per trip)								
End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e	BC	OC
	1,432	0.07	0.02	1,439	1,460	0.10	0.23
	2	0.00	0.00	2	2	0.00	0.00
	8	0.00	0.00	8	8	0.00	0.00
Total Emissions (tonne)	1,442	0.07	0.02	1,450	1,471	0.10	0.20
Emissions Rate (g/tonne MGO)	3,171,667	152	49	3,187,895	3,234,406	226	433
Emissions Rate (g/mmBtu MGO, LHV)	78,179	4	1	78,579	79,725	6	11

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Aux Boiler	
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8	
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8	Looks like LNG
Fuel Consumed (MT MGOe)	450.1	3.0	1.6	

Within 200nm							Emissions Factors (g/kWh)			
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Outside 200nm							Emissions Factors (g/kWh)			
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Fugitive Emissions from Equipment Leaks

EQUIPMENT INFORMATION

Component	Phase	Fluid Serviced									Emission Factors[3] (lb/hr per component)	LDAR Control Efficiency[4]
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas		
Valves	Gas/Vapor	39	9	12	36			112	185	30	0.001370	75%
	Light Liquid					33	244				0.005370	75%
	Heavy Liquid										0.000502	0%
Pump Seals	Light Liquid					1					0.049300	75%
	Heavy Liquid										0.009820	0%
Flanges/Connectors	Gas/Vapor	0	7	2	15			28	77	15	0.000559	30%
	Light Liquid					6	114				0.000559	30%
	Heavy Liquid										0.000559	30%
Compressor Seals	Gas/Vapor	0	2	0	0	0	0	1	1	0	0.016550	75%
Relief Valves	Gas/Vapor	3	0	1	3	1	19	8	9	2	0.022030	75%
Swivel Joints	Light Liquid						4				0.049300	75%

FLUID HAP/TAP CONTENT

Pollutant	CAS / ID	Fluid								
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas
Methane Content (%wt)[1]	74-82-8	100%	100%	100%	100%	100%	100%	100%	100%	100%
n-Hexane (ppmw)[1]	110-54-3	70	5.7E-10	0	1,185	210,669	27	0	1,185	1,185
Hydrogen sulfide (ppmw)[1]	2148878	3,128	0.00035	0	22	0.010	0.21	0	22	166
Benzene (ppmw)[b, 2]	71-43-2	4.0	4.0	0	4.0	4.0	4.0	0	4.0	4.0
Ethylbenzene (ppmw)[b, 2]	100-41-4	0.20	0.20	0	0.20	0.20	0.20	0	0.20	0.20
m,p-Xylene (ppmw)[b, 2]	106-42-3	1.3	1.3	0	1.3	1.3	1.3	0	1.3	1.3
o-Xylene (ppmw)[b, 2]	95-47-6	0.22	0.22	0	0.22	0.22	0.22	0	0.22	0.22
Toluene (ppmw)[b, 2]	108-88-3	3.5	3.5	0	3.5	3.5	3.5	0	3.5	3.5

POTENTIAL EMISSIONS

Pollutant	CAS / ID	Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas	Total
Hourly Emissions[a] (lb/hr)											
Methane[6]	74-82-8	0.02988000	0.01409660	0.01040010	0.03472200	0.06448280	0.52612070	0.09751390	0.14719760	0.02715950	0.95157320
n-Hexane	110-54-3	0.00000208	0.00000000	0.00000000	0.00004113	0.01358456	0.00001441	0.00000000	0.00017437	0.00003217	0.01384873
Hydrogen sulfide	2148878	0.00009345	0.00000000	0.00000000	0.00000075	0.00000000	0.00000011	0.00000000	0.00000319	0.00000451	0.00010202
Benzene	71-43-2	0.00000012	0.00000006	0.00000000	0.00000014	0.00000026	0.00000212	0.00000000	0.00000059	0.00000011	0.00000341
Ethylbenzene	100-41-4	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000010	0.00000000	0.00000003	0.00000001	0.00000016
m,p-Xylene	106-42-3	0.00000004	0.00000002	0.00000000	0.00000005	0.00000009	0.00000070	0.00000000	0.00000020	0.00000004	0.00000113
o-Xylene	95-47-6	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000012	0.00000000	0.00000003	0.00000001	0.00000019
Toluene	108-88-3	0.00000010	0.00000005	0.00000000	0.00000012	0.00000022	0.00000183	0.00000000	0.00000051	0.00000009	0.00000294
Total HAPs	HAP	0.00000028	0.00000013	0.00000000	0.00000032	0.00000060	0.00000488	0.00000000	0.00000136	0.00000025	0.00000782
Daily Emissions[a] (kg / day)											
Methane[6]	74-82-8	0.32528018	0.15345866	0.11321775	0.37799125	0.70197379	5.72746442	1.06155753	1.60242510	0.29566423	10.35903292
n-Hexane	110-54-3	0.00002263	0.00000000	0.00000000	0.00044777	0.14788443	0.00015692	0.00000000	0.00189824	0.00035025	0.15076024
Hydrogen sulfide	2148878	0.00101733	0.00000000	0.00000000	0.00000819	0.00000001	0.00000121	0.00000000	0.00003474	0.00004914	0.00111062
Benzene	71-43-2	0.00000131	0.00000062	0.00000000	0.00000153	0.00000283	0.00002312	0.00000000	0.00000647	0.00000119	0.00003707
Ethylbenzene	100-41-4	0.00000006	0.00000003	0.00000000	0.00000007	0.00000014	0.00000112	0.00000000	0.00000031	0.00000006	0.00000179
m,p-Xylene	106-42-3	0.00000043	0.00000020	0.00000000	0.00000050	0.00000094	0.00000765	0.00000000	0.00000214	0.00000039	0.00001227
o-Xylene	95-47-6	0.00000007	0.00000003	0.00000000	0.00000008	0.00000016	0.00000128	0.00000000	0.00000036	0.00000007	0.00000205
Toluene	108-88-3	0.00000113	0.00000053	0.00000000	0.00000132	0.00000244	0.00001994	0.00000000	0.00000558	0.00000103	0.00003197
Total HAPs	HAP	0.00000302	0.00000142	0.00000000	0.00000350	0.00000651	0.00005311	0.00000000	0.00001486	0.00000274	0.00008516
Annual Emissions[a] (short ton per year)											
Methane[6]	74-82-8	0.13087440	0.06174311	0.04555244	0.15208236	0.28243466	2.30440867	0.42711088	0.64472549	0.11895861	4.16789062
n-Hexane	110-54-3	0.00000910	0.00000000	0.00000000	0.00018016	0.05950036	0.00006314	0.00000000	0.00076375	0.00014092	0.06065742
Hydrogen sulfide	2148878	0.00040932	0.00000000	0.00000000	0.00000330	0.00000000	0.00000049	0.00000000	0.00001398	0.00001977	0.00044685
Benzene	71-43-2	0.00000053	0.00000025	0.00000000	0.00000061	0.00000114	0.00000930	0.00000000	0.00000260	0.00000048	0.00001492
Ethylbenzene	100-41-4	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000045	0.00000000	0.00000013	0.00000002	0.00000072
m,p-Xylene	106-42-3	0.00000017	0.00000008	0.00000000	0.00000020	0.00000038	0.00000308	0.00000000	0.00000086	0.00000016	0.00000494
o-Xylene	95-47-6	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000052	0.00000000	0.00000014	0.00000003	0.00000083
Toluene	108-88-3	0.00000046	0.00000021	0.00000000	0.00000053	0.00000098	0.00000802	0.00000000	0.00000224	0.00000041	0.00001286
Total HAPs	HAP	0.00000121	0.00000057	0.00000000	0.00000141	0.00000262	0.00002137	0.00000000	0.00000598	0.00000110	0.00003426

If Capacity is 500.000 gal/day a factor of 2 is applied

metric tonne&year
7.562171126

Calculations:

[a] Hourly Emissions (lb/hr) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)]

Annual Emissions (tpy) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)] x [Hours of Operation (hrs/yr)] / [2,000 lb/ton]

Hours of Operation (hrs/yr) = 8,760

[b] Pollutant Concentration (ppmw) = [Pollutant Concentration ($\mu g/m^3$)] / [453.6 g/lb] / [10^6 $\mu g/g$] / [35.31 ft^3/m^3] / [Gas Density (lb/cf)] x 10^6

Benzene Concentration ($\mu g/m^3$) =	2,980	[5]
Ethylbenzene Concentration ($\mu g/m^3$) =	144	[5]
m,p-Xylene Concentration ($\mu g/m^3$) =	986	[5]
o-Xylene Concentration ($\mu g/m^3$) =	165	[5]
Toluene Concentration ($\mu g/m^3$) =	2,570	[5]
Natural Gas Density (lb/scf) =	0.046	[5]

Notes:

[1] Provided by CB&I.

[2] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most HAPs will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we assume each fluid has the full concentration of HAP to provide a conservative emissions estimate.

[3] Terminal/Depot factors from South Coast Air Quality Management District's "Guidelines for Fugitive Emissions Calculations" (June 2003). In this guidance, the District updated emissions factors that were identified in the EPA's "Protocol for Equipment Leak Emission Estimates (November 1995).

[4] Control effectiveness from Texas Commission for Environmental Quality (TCEQ) "Control Efficiencies for TCEQ Leak Detection and Repair Programs" (July 2011) for its 28M fugitive leak detection program.

[5] See fuel characteristics in Table B-2.

[6] Assume all VOC is CH_4.

Life Cycle Associates, LLC

Fuel Life Cycle Factors Sheet -4.42%

Lookup Key	AR5_100	AR5_20	AR4_100	AR4_20
AR Edition	AR5	AR5	AR4	AR4
Time Horizon	100	20	100	20
CO_2	1	1	1	1
CH_4	30	85	25	72
N_2O	265	264	298	289
BC	900	3200	900	3200
OC	-69	-240	-69	-240

Global Warming Potential, Molecular Weight

Species	GWP	Mol Wt	Variable Name GWP	MW
CO2	1.000	43.999	CO2_GWP	CO2_MW
CH4	25.000	16.042	CH4_GWP	CH4_MW
N2O	298.000	44.007	N2O_GWP	N2O_MW
VOC	3.117	10.209	VOC_GWP	VOC_MW
CO	1.571	28.005	CO_GWP	CO_MW
NO2	0.000	45.995	NO2_GWP	NO2_MW
BC	900.000			
OC	-69.000			
C		12.011		C_MW
H		1.008		H_MW
O		15.994		O_MW
N		14.007		N_MW
Ca		40.078		Ca_MW
Cl		35.453		Cl_MW
Na		22.990		Na_MW
S		32.065		S_MW
P		30.974		P_MW
K		39.098		K_MW

Carbon and Sulfur Ratios of Pollutants

	Ratio	Variable Name	CO_2/pollutant
Carbon ratio of VOC	0.85	VOC_C_Ratio	3.11
Carbon ratio of CO	0.43	CO_C_Ratio	1.57
Carbon ratio of CH4	0.75	CH4_C_Ratio	2.74
Carbon ratio of CO2	0.27	CO2_C_Ratio	1.00
Sulfur ratio of SO2	0.50	SO2_S_Ratio	

Conversion Factors

		Variable Name	
Energy			
J/Btu	1055.056	JperBtu	
Btu/MJ	947.82	BtuperMJ	
Btu/kWh	3412.1	BtuperkWh	
Mass			
g/lb	453.597	gperlb	
metric tonne/ton	0.907	tonneperton	907194.049
ton/metric tonne	1.102	shorttonpertonne	
lb/kg	2.205	lbperkg	
Volume			
scf/m3	35.3000	scfperm3	
L/gal	3.785	lpergal	
Area			
acre/hectare	2.471	acreperhectare	
Distance			
cm/inch	2.54	cmperinch	
mi/naut mi	1.151	mipernaut	
ft/mi	5280		
km/mi	1.609	kmpermi	
scf/lb mol	379	scfperlbmol	
NL/g mol	22.414	Lpergmol	
Capacity			
kW/hr	1.341	kwperhp	

Emission Factors

Washington

Fuel/ Application	Equipment Type	CO_2e	CH_4	N_2O	CO_2e
GREET WTT Emissions (g/mmBtu), LHV					
Diesel	Diesel Engine	78,187	4.2	0.6	78,472
Diesel	HD Truck	78,186	4.7	0.2	78,357
Diesel	Industrial Boiler	78,198	0.2	0.9	78,477
Gasoline, E10	Gasoline Engine	76,829	3.0	0.6	77,083
Bunker Fuel	**TOTE Marine Engine**	**78,579**	**1.2**	**3.7**	**79,725**
Bunker Fuel	**Residual Oil**	**85,003**	**4.2**		
Natural Gas	IC Engine	58,333	392	0.1	68,175
Natural Gas	Turbine, CC	59,410	1.1	0.1	59,474
Natural Gas	Small Boiler	59,330	1.1	0.4	59,461
Natural Gas	Large Boiler	59,410	1.1	0.8	59,660
LNG	**TOTE Marine Engine**	**53,914**	**637.0**	**3.7**	**70,955**
LNG	**IC Engine, GREET**	58,059	92		
LNG	**Marine Engine, This Study**	58,059			
LNG	Truck	57,459	309.8	0.0	65,213
LNG	NG Peak Shaving	58,308	1.1	0.4	58,439
LPG from Tacoma LNG	Boiler	68,058	1.1	1.1	68,403
LPG, conventional	Boiler	68,773	1.1	1.1	69,118
Waste Flare LPG - Tacoma LNG plant	Flare	68,773	1.1	1.1	69,118
Waste Flare gas - LNG plant	Flare	68,662	1.1	1.1	59,660
Fuel Gas	Boiler	59,410	1.1	0.8	59,660
Coal	Boiler	100,041	1.1	1.6	100,540

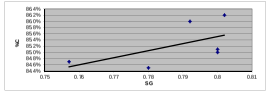
Specifications of Fuels, Global Warming Potentials of Greenhouse Gases, and Carbon and Sulfur Ratios of Pollutants 3.16875 0.92579

1) Specifications of Fuels

Fuel	Calculation: LHV or HHV in calculation of	Heating Value LHV	Heating Value HHV	Density Density	C ratio (% by wt)	S ratio (ppm by wt)	S ratio	SO_2	Total C in Fuel LHV	Carbon Fr Actor Fossil C in Fuel LHV	Biogenic C in Fuel LHV	Heating Value LHV	Heating Value HHV	Heating Value LHV	Heating Value HHV	LHV/HHV ratio	Other Properties Density		Source	Citation
Use LHV or HHV in calculation of:		1 = LHV, 2 = HHV																		
Liquid Fuels:		Btu/gal	Btu/gal	Btu/gal	g/gal		Ratio by Wt.	g/million Btu	g CO2/million Btu	g CO2/million Btu	g CO2/million Btu	g CO2/MJ 2	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/MJ	lb/gal	kg/L		
Diesel		128,700	138,690	7,079	87.0%	15	0.000015	15	77,164	77,164	-	73.2	42.7	45.5	18,352	19,580	0.9373	7.07	0.847	CA_GREET	
Conventional gasoline		116,090	124,340	5,819	86.5%	30	0.000030	1	76,168	76,168	-	72.8	43.4	46.5	18,658	20,007	0.9329	6.21	0.745	GREET1_2012	Wang (2012)
Reform diesel or low-sulfur gasoline		113,602	121,648	2,830	86.3%	2	0.000020	1	78,164	78,744	-	74.6	42.4	45.4	18,231	19,538	0.9323	6.24	0.747	Calculation	
Carbolide for CA/RFG		113,300	124,340	2,767	85.9%	15		15	76,850	76,850	-	72.8	43.2	47.4	18,573	20,388	0.9112	6.10	0.731	CA_GREET	Unnasch (2009)
CA reformulated gasoline		109,772	120,541	2,788	82.9%	10	0.000011	0	77,131	77,131	-	73.1	41.5	45.6	17,859	19,612	0.9107	6.15	0.737	CA_GREET	
U.S. conventional Wide		116,090	127,395	5,819	86.5%	200	0.000200	5	76,127	76,127	-	74.1	42.8	45.8	18,357	19,676	0.9350	6.98	0.837	CA_GREET	
Diesel for non-road engines		128,450	129,450	7,079	87.0%	150	0.000150	4	78,127	78,127	-	74.1	42.8	45.8	18,358	19,676	1355.5	0.9350	6.98	0.837	CA_GREET	
Ultra-sulfur diesel		127,496	127,496	139,075	3,448	86.6%	10	0.000011	0.071	78,307	78,307	-	74.0	42.8	44.7	18,402	19,232	1345.5	0.9578	6.93	0.830	CA_GREET	
Petroleum naphtha		116,100	125,080	2,748	85.6%	1	0.000001	0	73,104	73,104	-	69.3	44.9	48.1	19,320	20,680	1224.4	0.9348	6.05	0.725	CA_GREET	
ETL naphtha		111,500	119,740	2,851	84.7%	1	0.000001	0	73,323	73,323	-	69.5	44.4	47.7	19,092	20,488	1117.7	0.9314	5.94	0.712	CA_GREET	
Residual oil		140,353	150,110	3,752	85.8%	5,000	0.005000	134	85,003	85,003	-	80.6	39.5	42.2	16,998	18,148	1481.1	0.9350	8.27	0.991	CA_GREET	
Bunker fuel for ocean tanker		140,353	150,110	3,752	85.8%	28,000	0.028000	749	85,003	85,003	-	80.6	39.5	42.2	16,998	18,148	1481.1	0.9350	8.27	0.991	CA_GREET	
Methanol		57,250	65,000	3,000	37.5%	0	0.000000	0	72,130	72,130	-	68.4	20.1	22.9	8,639	9,838	60.4	0.8781	6.63	0.794	CA_GREET	
Ethanol		76,330	84,530	2,662	52.2%	1	0.000001	0	74,856	-	76,856	70.9	26.9519	29.8	11,587	12,832	80.5	0.9030	6.59	0.789	CA_GREET	
Butanol		99,837	109,458	3,065	64.9%	0	0.000000	0	72,964	-	72,944	69.1	34.4	37.3	14,795	16,091	1055.3	0.9205	6.76	0.810	CA_GREET	
Acetone		83,137	89,511	3,064	62.0%	0	0.000000	0	80,868	-	80,958	76.7	29.6	31.9	12,728	13,699	877.7	0.9287	6.53	0.783	CA_GREET	
E-Diesel Additives		116,090	124,340	2,819	86.3%	20	0.000020	1	76,768	76,768	-	72.8	43.4	46.5	18,660	20,007	1225.5	0.9336	6.21	0.745	CA_GREET	
LPG		75,578	79,574	4,190	81.8%	1	0.000001	0	76,254	76,254	-	72.3	41.5	45.9	17,838	19,746	79.7	0.9029	4.24	0.508	CA_GREET	
Liquefied natural gas (LNG)		77,156	84,931	1,648	75.1%	0	0.000000	0	58,680	58,680	-	55.6	49.5	54.1	21,292	23,240	81.4	0.9149	3.63	0.435	CA_GREET	
Dimethyl ether		66,163	73,510	2,616	52.2%	0	0.000000	0	69,854	69,854	-	66.2	28.9	31.7	12,427	13,631	72.7	0.9117	5.55	0.665	CA_GREET	
Dimethoxy methane (DMM)		72,200	72,200	79,197	3,052	47.4%	0	0.000000	0	78,282	78,282	-	74.2	23.4	25.7	10,061	11,038	76.2	0.9117	7.18	0.860	CA_GREET	
Algae Oil, TAG		128,130	134,516	7,351	76.5%		0	0.000000	0	-	-	-	0.0	38.1	42.3	16,372	18,191	1311.2	0.9000	7.59	0.910	CA_GREET	
Vegetable Oil (PVO)				8,400									0.0	37.5	0.0		0		7.50	0.898	Look something up	
Methyl ester (biodiesel, BD)		118,550	127,960	7,351	77.9%		0	0.000000	0	79,919	3,873	76,046	75.7	37.5	40.2	16,136	17,289	1261	0.9343	7.41	0.888	CA_GREET	
Ethyl ester (biodiesel, BD)		118,550	127,960	7,351	77.9%		0	0.000000	0	83,225	-	-	78.9	36.0	38.6	16,941	18,584		1.0216	7.72	0.925	CA_GREET	
DTL Diesel		122,600	132,100	2,953	84.9%		0	0.000000	0	74,702	-	74,702	70.8	43.9	47.2	18,893	20,358	1229.6	0.9256	6.51	0.780	CA_GREET	
Renewable Diesel I (SuperCetane)		117,059	125,294	2,635	87.1%		0	0.000000	0	77,275	-	77,275	73.2	43.6	46.6	18,739	20,047	1215	0.9343	6.25	0.749	CA_GREET	
Renewable Diesel II (UOP-HDO)		122,687	130,817	2,848	87.1%		0	0.000000	0	76,564	-	76,564	72.5	44.0	46.8	18,908	20,138	1229.7	0.9394	6.50	0.779	CA_GREET	
Renewable Gasoline		115,983	124,230	2,830	84.0%		0	0.000000	0	75,083	-	75,083	71.2	43.2	46.3	18,560	19,932	1224.4	0.9336	6.24	0.748	CA_GREET	
Liquid hydrogen		30,500	36,000	4,430	0.0%		0	0.000000	0	-	-	-	120.1	141.8	51,622	60,965	32.2	0.8468	0.59	0.071	CA_GREET	
Methyl tertiary butyl ether (MTBE)		93,540	99,540	101,130	2,611	68.1%	0	0.000000	0	74,969	74,969	-	71.1	35.1	38.0	15,096	16,330	967	0.9249	6.20	0.743	CA_GREET	
Ethyl tertiary butyl ether (ETBE)		96,720	99,720	104,530	2,810	70.6%	0	0.000000	0	75,139	75,139	-	71.2	36.3	39.2	15,613	16,870	1020	0.9253	6.19	0.742	CA_GREET	
Tertiary amyl methyl ether (TAME)		100,480	100,480	108,570	2,913	70.6%	0	0.000000	0	74,979	74,979	-	71.1	38.4	39.3	15,646	16,900	1060	0.9255	6.42	0.770	CA_GREET	
Butane		94,976	94,976	105,200	2,913	62.8%	0	0.000000	0	70,880	70,880	-	67.0	45.3	49.2	19,466	21,137	1002	0.9201	4.88	0.585	CA_GREET	
Isobutane		90,080	90,080	99,560	2,118	82.8%	0	0.000000	0	71,334	71,334	-	67.6	44.9	49.1	19,288	21,108	950	0.9138	4.67	0.560	CA_GREET	
Isobutylene		95,720	95,720	105,010	2,253	85.7%	0	0.000000	0	73,894	73,894	-	70.0	44.8	48.2	19,271	20,739	1010	0.9292	4.97	0.595	CA_GREET	
Propane		84,250	84,250	91,420	3,000	81.8%	0	0.000000	0	68,260	68,260	-	64.7	46.3	50.2	19,908	21,508	889	0.9216	4.23	0.507	CA_GREET	
Natural gas liquids		83,686	83,686	90,966			0	0.000000	0	-	-	-	0.0							0.000	CA_GREET	
Mill gas (in refineries)		138,500	138,500	142,960				0.000000					0.0							0.000	CA_GREET	
Gaseous Fuels (at 68F and 1atm):		Btu/ft3	Btu/ft3	Btu/ft3	g/ft3		Ratio by Wt.	g/million Btu	g CO2/million Btu	g CO2/million Btu		g CO2/MJ 2	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/MJ	lb/ft3			
Natural gas		964	964	1,030	21.18	3,000	13.18	0.000014	0	59,314	59,314	-	56.2	49.0	54.3	21,078	23,330	1.0	0.0029	0.05			CA_GREET	15.34664142
Hydrogen		262	262	301	2.48	0.0%	0	0.000000	0				0.0	120.0	140.8	51,578	60,546	0.9	0.0020	0.01			CA_GREET	
Carbon Dioxide					56.98	27.3%	0	0.000000												0.12			CA_GREET	
Mill gas (in refineries)		1,466	1,466	1,550	30.8	37.5%				31,359			29.6	46.9	51.0	20,183	21,905	2.6	0.0035	0.07			CA_GREET	
Landfill Gas		466	466	496	34.54	20.5%				58,017			55.0	13.6	15.2	5,857	6,514		0.0092	0.08			CA_GREET	
Fuel Gas (RD I)																							CA_GREET	
Shale Gas		930	930	1,030	20.40	72.8%	13.72	0.000014	0	58,178	58,178	-	55.1	48.1	53.3	20,639	22,902	1.0	0.0029	0.04			CA_GREET	
Flared Gas		930	930	1,030	20.40	72.8%	13.72	0.000014	0	58,178	58,178	-	55.1	48.1	53.3	20,639	22,902	1.0	0.0029	0.04			CA_GREET	
Propane Fuel Mix (RD I)																							CA_GREET	
Solid Fuels		Btu/ton	Btu/ton	Btu/ton			Ratio by Wt.		g CO2/million Btu	g CO2/million Btu		g CO2/MJ 2	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/MJ				
Coal		20,549,200	19,945,300	25,669,540		63.7%	11,100	0.011100		109,308	108,305	-	102.7	22.7	24.0	9773.2	10364.3	20,922	0.0465				CA_GREET	
Bituminous cos		22,460,600	22,665,300	25,669,540		78.5%	11,100	0.011100		111,711	113,711	-	105.9	26.1	27.3	11239.3	11733.0	23,997	0.9580				CA_GREET	
Coking coal		26,600,497	24,600,497	25,679,670		74.7%	11,100	0.011100		100,913	100,913	-	95.6	28.6	29.9	12300.2	12839.8	25,995	0.9580				CA_GREET	
Lignite																								
Farmed trees		16,811,000	16,811,000	17,703,170		51.7%	0	0.000000		102,206	-	102,204	96.9	19.6	20.6	8605.5	8851.6	17,737	0.9496				CA_GREET	
Herbaceous biomass		16,797,556	14,797,556	15,582,670		42.5%	0	0.000000		95,473	-	99,673	90.7	17.2	18.1	7399.8	7761.4	15,912	0.9496					
Corn stover		14,075,990	14,075,990	14,974,460		44.5%	0	0.000000		105,066	-	105,064	99.6	16.4	17.4	7080.0	7467.2	14,851	0.9400					
Forest residue		13,243,460	13,243,460	14,184,160		51.7%	0	0.000000		129,736	-	129,736	123.0	15.4	16.5	6621.7	7002.1	13,973	0.9350				CA_GREET	
Sugarcane straw						50.0%																		
Sugarcane bagasse		12,947,318	12,947,318	14,062,678		46.3%				130,648	-	118,843	112.6	15.1	16.4	6473.7	7031.3	13,660	0.9207					
Pet Coke		25,370,000	25,370,000	26,920,000		79.9%	68,000	0.068000		106,998	104,664	-	99.2	29.5	31.3	12685.0	13460.0	26,797	0.9424					
Tillage solids																								
Other																				Sonny has something				
Jet Fuel Properties		Btu/gal	Btu/gal	Btu/gal	g/gal		Ratio by Wt.	g/million Btu	g CO2/million Btu	g CO2/million Btu	g CO2/million Btu	g CO2/MJ 2	MJ/kg	MJ/kg	Btu/lb								
Conventional Petroleum Jet Fuel		126,307	124,207	132,949	3,036	85.2%	700	0.000700	17	77,121	77,121	-	73.1	43.2	43.2	18,573		131.2		6.69	0.802	GREET1_2012		86.2%
Ultra Low Sulfur Petroleum Jet Fuel (ULSJ)		126,046	123,041	131,595	2,998	86.0%	15	0.000015	0	76,764	76,764	-	72.8	43.3	43.3	18,636		129.8		6.61	0.792	GREET1_2012		86.0%
STL Aviation Fuel		118,777	119,777	126,123	2,899	84.7%	0	0.000000	0	74,232	74,232	-	70.4	44.1	44.1	18,963		126.4		6.32	0.757	GREET1_2012		84.7%
STL Lubricant Base Oil		135,278	118,256	135,477	3,028	85.1%	0	0.000000	0	76,892	79,932	-	75.7	41.2	41.2	17,713		124.8		6.66	0.8	Estel		85.1%
STL Wax		135,278	126,259	135,073	3,028	85.0%	0	0.000000	0	74,464	74,664	-	70.9	44.0	44.0	18,917		133.2		6.68	0.8	Estel		85.0%
Naphtha/Diesel		126,536	124,535	133,163	2,953	84.5%	0	0.000000	0	73,391	73,391	-	69.6	44.5	44.5	19,132		131.4		6.91	0.78	Estel		84.5%

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1) Emission Factors of Fuel Combustion for Stationary Applications (grams per mmBtu of fuel burned), GREET EF Tab

	Natural Gas							Residual Oil						Diesel Fuel					Gasoline		Crude	Coal			Diesel	Diesel	Fuel Gas	Flare Gas	LNG	LPG	LPG	LNG	LNG	LNG
	Utility/ Industrial Boiler (>100 mmBtu/hr input)	Small Industrial Boiler (10-100 mmBtu/hr input)	Large Gas Turbine	CC Gas Turbine	Small Turbine	Stationary Reciprocating Engine	NG Flaring in Oil Field	Utility Boiler	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Marine Vessel TOTE	Turbine	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Turbine	Farming Tractor	Stationary Reciprocating Engine	Farming Tractor	Industrial Boiler	Utility Boiler	IGCC Turbine	Industrial Boiler	Heavy Duty Truck	Locomotive	Industrial Boiler	Flare Gas	Heavy Duty Truck	Industrial Boiler	Flaring Tacoma	ND Peak shaving	Marine Engine TOTE CASE	Marine Engine
VOC	2.540	2.540	1.056	0.267	1.056	1,931.916	2.900	2.089	0.905	3.651	2.027	**61.187**	0.258	0.800	1.201	2.027	0.258	63.020	598.150	193.920	0.820	1.495	0.122	0.472	5.909	5.909	2.540	2.540	26.225	4.272	4.272	2.540	**0.076**	79.908
CO	22.210	24.978	41.286	14.530	41.286	705,993	26.000	16.209	36.017	16.159	657.005	**133.141**	1.568	20.867	25.115	657.005	1.565	349.168	1,520.438	6,807.905	23.746	12.417	2.235	23.955	57.875	57.875	22.210	22.210	1,432.339	3.531	3.531	24.970	**210.273**	90.798
NOx	36.400	41.038	31.968	17.426	31.968	832.952	48.000	433.518	137.081	177.698	2,076.988	**1,471.897**	256.412	53.860	66.583	2,076.988	256.412	628.010	98.588	267.630	181.610	116.030	11.902	12.631	53.121	53.121	36.400	36.400	82.257	69.413	69.413	41.050	**225.723**	2,085.240
PM10	3.507	3.507	3.575	0.133	3.575	7.197	3.700	17.379	15.345	35.345	5.408	**29.052**	25.944	8.122	8.404	54.608	25.944	55.970	52.558	7.840	29.712	28.841	25.941	2.663	10.052	10.052	3.507	3.507	7.416	3.738	3.738	3.507	**2.465**	18.121
PM2.5	3.507	3.507	3.575	0.133	3.575	7.197	3.700	13.482	16.173	16.179	5.408	**27.850**	6.576	5.473	7.522	54.608	6.574	54.261	52.558	7.665	19.310	20.276	73.411	2.521	4.619	4.619	3.507	3.507	3.616	3.738	3.738	3.507	**2.462**	16.675
SOx	0.269	0.269	0.269	0.269	0.269	0.269	0.269	739.297	683.325	667.739	267.327	**52.270**	267.327	0.542	0.543	0.542	0.542	0.542	1.239	1.238	395.445	325.409	4.110	544.401	0.545	0.545	0.269	0.269	0.000	0.009	0.000	0.000	**0.422**	0.000
BC	0.579	0.579	0.104	0.004	0.104	1.439	3.551	0.853	1.025	1.025	43.937	**5.070**	0.017	0.547	0.753	43.937	0.017	30.568	5.250	1.038	0.502	0.872	3.157	0.108	0.072	0.072	0.579	0.579	0.287	0.617	0.617	0.579	**0.534**	2.901
OC	1.501	1.501	2.491	0.096	2.491	3.080	0.185	0.594	0.712	0.712	9.760	**10.677**	1.646	1.368	1.881	9.760	1.644	18.948	16.817	6.571	0.409	1.645	5.946	0.204	0.125	0.125	1.501	1.501	0.521	1.605	1.605	1.501	**1.149**	6.926
CH4	1.060	1.060	1.056	1.142	1.056	392.354	49.000	3.182	3.231	1.539	4.221	**1.201**	3.024	0.198	0.764	4.221	3.024	0.638	3.000	3.575	0.368	1.058	1.092	1.246	4.750	4.750	1.060	1.060	309.767	1.068	1.068	1.060	**636.970**	91.620
N2O	0.750	0.303	0.102	0.119	0.102	0.111	1.000	0.618	1.712	1.712	0.600	**3.746**	0.603	0.918	0.918	0.600	0.603	0.920	0.600	1.104	2.000	1.596	1.581	0.857	0.175	0.175	0.750	0.750	0.031	4.806	4.806	0.350	**3.746**	2.000
CO2	59,364.9	59,241.6	59,341.5	59,185.9	59,341.5	56,809.8	59,229.1	85,040.5	85,012.9	85,040.1	84,010.5	**78,178.9**	85,050.5	78,163.2	78,151.5	77,148.7	78,187.5	77,452.2	72,576.0	65,371.4	77,264.4	101,017.1	100,037.0	100,001.4	78,076.6	78,076.6	57,408.9	68,642.0	55,095.5	68,038.6	68,754.6	58,241.1	**53,912.3**	57,667.7
CO2c	59,403.8	59,321.9	59,403.8	59,403.5	59,403.8	58,113.1	59,277.8	85,072.5	85,072.3	85,077.6	85,059.4	**79,578.9**	85,072.9	78,198.5	78,196.9	78,187.2	78,190.7	78,197.6	76,238.7	74,926.6	77,304.2	101,041.2	101,041.3	100,940.7	78,186.0	78,186.0	57,451.7	68,704.8	57,459.3	68,058.5	68,773.6	58,709.2	**53,914.3**	58,093.2
Biogenic CO2																																		
		59332.81																																
		59332.81																																

Emissions Factors and Activity Assumptions

Source: UPDATED 2016 Puget Sound Maritime Air Emissions Inventory, Punlished Feb 2018 APPENDIX B: OGV EMISSIONS ESTIMATING METHODOLOGY (unless otherwise noted below table)
https://pugetsoundmaritimeairforum.org/2016-puget-sound-maritime-air-emissions-inventory/
The North American ECA introduced in 2015, requiring 0.1% sulfur content in diesel fuel compared to heavy fuel oil with high sulfur content (2.7%) used by the

Table B.2: Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Slow speed diesel	< 1999	Slow speed diesel < 1999	17	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	< 1999	Medium speed diesel < 1999	13.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	16	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2	12.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	14.4	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2	10.5	0.5	1.1	0.42	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.00	0.02	0.02	0
Gas turbine	All	Gas turbine All	6.1	0.1	0.2	0.6	0.1	0.04	0
Steamship	All	Steamship All	2.1	0.1	0.2	0.6	0.8	0.6	0

Medium speed means RPM>130
LNG emissions factors from "GHG and NOx Emissions from Gas Fueled Engines", SINTEF, 2017. PM emissions based on EPA certification data of 2017 Wartsila DF engine (rated at 8MW)
VOC emissions for LNG engines are estimated as NMVOC, based on a typical ratio of 3.8% NMVOC/CH4 emissions, as described in "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector", MARAD, 201!
https://www.nho.no/siteassets/nhos-filer-og-bilder/filer-og-dokumenter/nox-fondet/dette-er-nox-fondet/presentasjoner-og-rapporter/methane-slip-from-gas-engines-mainreport-1492296.pdf
https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf
Sulfur emissions rates for Low Pressure DF LNG engines based on SINEF report (Table 5.1) indicating 95-98% SOx reductions from LNG operation relative to MDO. Assume pilot fuel is MDO with a 0.5% sulfur content based on 2020 global sulfur ca

Table B.2: GHG Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine Model Year	Model Year	Key	CO2	N2O	CH4
Slow speed diesel	< 1999	Slow speed diesel < 1999	589	0.0310	0.0120
Medium speed diesel	< 1999	Medium speed diesel < 1999	648	0.0310	0.0100
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	589	0.0310	0.0120
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	648	0.0310	0.0100
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	589	0.0310	0.0120
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	648	0.0310	0.0100
Gas turbine	All	Gas turbine All	922	0.0800	0.0020
Steamship	All	Steamship All	922	0.0800	0.0020
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.0310	4.1000
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.0310	5.3000

Methane (CH4) slip
N2O emissions factors for LNG engines assumed to be equal to medium speed diesel

Table B.3: Low-Load Adjustment Multipliers for Emission Factors

Load	NOx	HC	CO	PM
2%	4.63	21.18	9.68	7.29
3%	2.92	11.68	6.46	4.33
4%	2.23	7.71	4.86	3.09
5%	1.83	5.61	3.89	2.44
6%	1.6	4.35	3.25	2.04
7%	1.45	3.52	2.79	1.79
8%	1.35	2.95	2.45	1.61
9%	1.27	2.52	2.18	1.48
10%	1.22	2.2	1.96	1.38
11%	1.17	1.96	1.79	1.3
12%	1.14	1.76	1.64	1.24
13%	1.11	1.6	1.52	1.19
14%	1.08	1.47	1.41	1.15
15%	1.06	1.36	1.32	1.11
16%	1.05	1.26	1.24	1.08
17%	1.03	1.6	1.17	1.06
18%	1.02	1.18	1.11	1.04
19%	1.01	1.11	1.05	1.02
20%	1	1	1.00	1.00

Source: 2012
Table 3.17: Composite Maneuvering Load Factors

Vessel Type	Load In	Load Out
Auto Carrier	0.04	0.06
Bulk	0.04	0.05
Containership	0.03	0.03
Cruise	0.03	0.04
General Cargo	0.03	0.04
ITB	0.04	0.06
Reefer	0.02	0.03
RoRo	0.02	0.02
Tanker	0.03	0.05

Table B.7: Auxiliary Engine Emission Factors, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Medium speed diesel	≤ 1999	Medium speed diesel ≤ 1999	13.8	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2	12.2	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2	10.5	0.4	1.1	0.44	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0.00
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.003515	0.02	0.02	0.00

LNG emissions factors for aux engines assumed to be equivalent to main engine emissions factors as both the main and aux engines are medium speed

Table B.7: Greenhouse Gas Emission Factors for Auxiliary Engines, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Medium speed diesel	All	Medium speed diesel All	683	0.029	0.008
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	683	0.029	0.008
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	683	0.029	0.008
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.029	4.1
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.029	5.3

Table B.12: Auxiliary Boiler Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	2	0.1	0.2	6	0.18	0.15	0
LNG Aux Boiler	All	LNG Aux Boiler All	2	0.1	0.2	0	0.16	0.15	0

Source: 2013 POLB Emissions Inventory

Table B.12: Auxiliary Boiler GHG Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	922	0.075	0.002
LNG Aux Boiler	All	LNG Aux Boiler All	644	0.075	0.002

Source: 2013 POLB Emissions Inventory

CO2 emissions for LNG based on ratios of carbon-per-BTU for bunker fuel and natural gas, as given in ANL GREET's fuel properties worksheet
N2O emissions for LNG assumed to be equal to fuel oil. CH4 emissions for LNG scaled based on fuel oil emissions and ratios of CH4 emissions from medium speed FO and LNG engines.

Table B.18: 2016 Auxiliary Engine Power and Load Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling
Auto Carrier	590	1224	876
Bulk	266	384	157
Bulk - Self Discharging	462	807	298
Bulk - Heavy Load	305	1223	136
Bulk - Wood Chips	266	1275	157
Container - 1000	892	1275	536
Container - 2000	1280	1911	945
Container - 3000	888	1689	965
Container - 4000	1493	2528	1106
Container - 5000	1444	2458	1203
Container - 6000	1598	2665	1461
Container - 7000	1332	2675	1325
Container - 8000	1497	4769	1449
Container - 9000	1493	4551	1383
Container - 10000	1662	2617	887
Cruise	na	na	na
General Cargo	471	1096	829
ITB	79	208	102
Reefer	1247	1168	900
RoRo	132	396	229
Tanker - Aframax	556	628	909
Tanker - Chemical	417	583	1271
Tanker - Handysize	560	600	900
Tanker - Panamax	488	600	379
Tanker - Suezmax	858	1289	2905

Table B1.1 2016 Auxiliary Boiler Energy Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling *
Auto Carrier	0	184	314
Bulk	0	94	125
Bulk - Self Discharging	0	103	125
Bulk - Heavy Load	0	94	134
Bulk - Wood Chips	0	134	134
Container - 1000	0	213	273
Container - 2000	0	282	361
Container - 3000	0	328	420
Container - 4000	0	371	477
Container - 5000	0	473	579
Container - 6000	0	567	615
Container - 7000	0	470	623
Container - 8000	0	506	668
Container - 9000	0	613	677
Container - 10000	0	458	581
Cruise	0	361	306
General Cargo		124	134
ITB	0	0	0
Reefer	0	237	306
RoRo	0	148	259
Tanker - Aframax	0	438	5036
Tanker - Chemical	0	136	568
Tanker - Handysize	0	144	2586
Tanker - Panamax	0	351	3421
Tanker - Suezmax	0	191	5843

*using upper limit

Table 3.22: Fuel Correction Factors

Fuel Used	NOx	VOC	CO	SO2	PM10	PM2.5	DPM	CO2	N2O	CH4
HFO (2.7% S)	1	1	1	1	1	1	1	1	1	1
HFO (1.5% S)	1	1	1	0.555	0.82	0.82	0.82	1	1	1
MGO (0.5% S)	0.94	1	1	0.185	0.25	0.25	0.25	1	0.94	1
MDO (1.5% S)	0.94	1	1	0.555	0.47	0.47	0.47	1	0.94	1
MGO (0.1% S)	1	1	1	1	1	1	1	1	1	1
MGO (0.3% S)	0.94	1	1	0.111	0.21	0.21	0.21	1	0.94	1
MGO (0.4% S)	0.94	1	1	0.148	0.23	0.23	0.23	1	0.94	1
ULSD	1	1	1	1.2007	1.18	1.18	1.18	1	1	1
LNG	1	1	1	1	1	1	1	1	1	1

LNG fuel correction factors set to 1 as direct emissions factors already account for LNG engines meeting Tier 3 standards
ULSD factors based on scaling from 0.5%S to 0.1%S MGO and further scaling 0.1%S MGO to 0.0015%S

Fuel Consumption Factors	SFOC	Units	Source
Main Engine	214.33	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Aux Engine	215.24	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Boiler	293.75	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above

Combusted Gas Characteristics
0.799393301

Parameters	Natural Gas[a]	Flared Waste Gas[a]									Diesel
		Liquefying Case 1	Liquefying Case 2	Liquefying Case 3	Liquefying Case 4	Liquefying Case 5	Holding	LNG Transfer A1	LNG Transfer A2/A3	LNG Transfer B	
Heat Content (Btu/scf)	1,093	346	466	1,644	864	1,825	1,144	506	506	223	138,000
Density (lb/scf)	0.046	0.101	0.091	0.088	0.097	0.087	0.049	0.058	0.059	0.067	
Sulfur Content (ppmw)[c]	25	337	912	524	250	587	17	0	0	0	15
VOC Content (wt%)	NA	9.6%	14%	51%	24%	58%	17%	0.10%	0.10%	0.10%	
Benzene Concentration (mg/m^3)[b]	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	
Ethylbenzene Concentration (mg/m^3	144	144	144	144	144	144	144	144	144	144	
m,p-Xylene Concentration (mg/m^3)[b]	986	986	986	986	986	986	986	986	986	986	
o-Xylene Concentration (mg/m^3)[b]	165	165	165	165	165	165	165	165	165	165	
Toluene Concentration (mg/m^3)[b]	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	

Notes:

[a] Provided by CB&I.

[c] Based on the Williams Gas Pipeline tariff of 0.25 grains per 100 cubic feet for H2S, the past 12-month maximum total sulfur (reported as H2S by Williams Gas Pipeline) of 0.603 grains per 100 cubic feet, and sulfur from odorant of 0.23 grains per 100 cubic feet (odorant injection rates provided by PSE).

[b] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most hazardous air pollutants (HAPs) will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we conservatively assume the waste gas has the full concentration of HAP.

Do not Print

4) Mass fractions of black carbon and organic carbon emissions of corresponding PM2.5 emission factors

4.1) Stationary, mobile, and open burning emission sources, %

	Natural gas						Coal		Biomass			Diesel								Gasoline			Residual fuel oil				Crude oil	Biochar	Jet fuel	
	Boiler	Engine	Combined	Simple cyc	Nonroad E	Flared	Boiler	IGCC	Industrial,	IGCC	Open burn	Industrial,	Simple cyc	Engine	Nonroad v	Nonroad E	Locomotiv	HDDT 8b	HDDT 6	Engine	Off-road v	Nonroad E	Boiler	Engine	Simple cyc	Ocean tan	Boiler	Boiler	Cruise	Landing and take-offs
BC	16.5	20.0	2.9	2.9	9.8	95.0	4.3	4.3	13.8	13.8	12.1	10.0	10.0	81.3	56.3	77.1	8.4	16.0	8.1	10.0	13.6	9.8	6.3	15.0	6.0	15.0	2.9	6.2	31.3	35.8
OC	42.8	42.8	68.0	68.0	83.7	5.0	8.1	8.1	32.6	32.6	33.9	25.0	25.0	18.1	34.9	21.1	88.6	66.0	88.0	32.0	86.4	83.7	4.4	39.0	4.0	39.0	2.1	79.9	30.3	26.0

GENERAL INPUTS

Date: 21-Sep-18
Version: 17

Comments/Source

LNG Plant Operation

0 1 if Bunker Barge Only for Scenario A

LNG Product - End use share

	Scenario A						Scenario B					Check		
LNG Production	End use share	gal/day	lb/day	Mgal/ year	tonne/ year		Enduse share	gal/day	lb/day	Mgal/ year	tonne/ year	gal/year (365)	Source: PSE-BID	Scenario A Volume Data
Total	**100.0%**	**250,000**	**#NAME?**	**88.75**	**#NAME?**		**100.00%**	**500,000**	**#NAME?**	**177.50**	**#NAME?**	**182,499,845**		**250,000**
On-site Peak Shaving	11.0%	27,397	#NAME?	9.73	#NAME?		5.48%	27,397	#NAME?	9.73	#NAME?	10,000,000		27,397
Gig Harbor Peak Shaving	0.0%	0	#NAME?	-	#NAME?		1.00%	5,000	#NAME?	1.78	#NAME?	1,825,000		0
On-road Trucking	0.0%	0	#NAME?	-	#NAME?		2.00%	10,000	#NAME?	3.55	#NAME?	3,650,000		0
TOTE Marine	42.7%	106,849	#NAME?	37.93	#NAME?		21.37%	106,849	#NAME?	37.93	#NAME?	39,000,000		106,849
Truck-to-Ship Bunkering	0.0%	0	#NAME?	-	#NAME?		1.00%	5,000	#NAME?	1.78	#NAME?	1,825,000		0
Other Marine (by Bunker Barge)	46.3%	115,753	#NAME?	41.09	#NAME?		69.15%	345,753	#NAME?	122.74	#NAME?	126,199,845		115,753

Results #NAME? #NAME? ktonne/year

Scenario Selection for End use Mix

	Scenario	Comment
Enduse Scenario	**A**	Pull Down

	Sub- Scenario	Comment
LPG is flared	Yes	Pull Down

EER for Marine		**Range**
1	Type in	1 to 1.015

Used GEN MIX		
Pwr Mix	**Washington**	**WA** Pull Down
Natural Gas Upstream		**GHGenius** Pull Down

Overall Operational Hours

Overall Operational Hours	**hours/year**	**days/year**
LNG Liquefaction Plant	8,520	355.0
LNG Pretreatment	8,520	355.0
LNG Flaring	8,760	365.0
LNG Vaporizer	240	10.0
Emergency Diesel Generator	500	20.8

GWP Basis		
AR Version	**AR4**	Pull Down
Timeframe	**100**	Pull Down
BC/OC	**No**	Pull Down
Correct BC/OC Ratios	**No**	Pull Down
Correct FCFs	**Yes**	Pull Down
Correct Fuel Heating Value	**Yes**	Pull Down

Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vap
Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vap
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

Energy/Electrcity Consumption LNG Plant

#NAME?		PSE Estimate		Calculated	
Equipment Capacity/Consumption		**(mmBtu/hr)**	**Fuel**	**(mmBtu/hr)**	**Input for 250.000 gal /day**
LNG Pretreatment	NG WPG heater	#NAME?	NG		9
LNG Pretreatment	NG Regenerator heater	#NAME?	NG		1.6
Waste gas flaring	Waste Gas Heat Input	#NAME?		#NAME?	35.6
LPG in Waste Gas		77	LPG		
Waste Gas, Mass Balance		88	C2/C5+		
Vaporizer	LNG Heater Capacity	66			66
		(gal/h)			
Emergency equipment	Diesel genrator	104.6	Diesel		104.6

WPG: Water Propylene Glycol

Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F pa
Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F pa
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F pa
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

LNG pretreatment CO_2 seperation efficiency **99.760%** Actual result based on LNG composition

Power Consumption LNG plant	**Baseline**	
LNG Production	1,348	kWh/1000 gal
Vaporizer	45	kWh/1000 gal

Source: page 13, PES response

Overall Mass Balance

Mass Input/Output: Based on 500,000 gal/day	NG Feed lb / Day	LNG Output lb / Day	Mass ratio NG/LNG	Density LNG g/gal	Density LNG lb/gal
	#NAME?	#NAME?	#NAME?	1,646	#NAME?

Calculated specs for Feed Gas, Emissions and Products

Component	NG - fired NG	Pretreatment Vent	To LNG	Waste Gas	LPG	Tacoma LNG
	mol%	mol%	mol%	mol%	mol%	mol%
CH4	91.31%	0.00%	5.12%	5.01%	5.36%	94.36%
C2H6	6.07%	0.00%	55.73%	79.83%	2.86%	4.32%
						0.00%
C3H8	1.54%	0.00%	21.83%	1.59%	66.26%	0.83%
i-C4H10	0.22%	0.00%	3.72%	0.27%	11.28%	0.10%
n-C4H10	0.24%	0.00%	4.55%	0.33%	13.79%	0.09%
i-C5H12	0.05%	0.00%	1.08%	1.41%	0.34%	0.01%
n-C5H12	0.03%	0.00%	0.81%	1.18%	0.00%	0.01%
C6+	0.03%	0.00%	0.84%	1.23%	0.00%	0.00%
N2	0.27%	54.81%	0.04%	0.05%	0.00%	0.28%
CO	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2S	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
O2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
He	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO2	0.22%	45.19%	6.29%	9.11%	0.10%	0.01%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
C factor (lb CO2/mmBtu)HHV	118.11	0.00	136.68	136.87	136.42	116.87
C factor (lb CO2/scf)	0.1287	0.0000	0.2741	0.2339	0.3625	0.1236
LHV (MJ/kg)	49.0	0.0	43.3	41.5	46.2	49.5
(g CO2/mmBtu), LHV	#NAME?	0.0	#NAME?	#NAME?	#NAME?	#NAME?
average molar weight	17.7	35.2	36.9	32.8	45.8	17.0
mol "C" per mol gas	1.11	0.45	2.36	2.01	3.12	1.06
carbon weight %	75.22%	15.40%	76.88%	73.74%	81.81%	75.10%
Carbon factor, gCO2/MJ	56.2	0.0	65.1	65.2	66.0	55.6
g CO2/mmBtu, LHV	59,333	0	68,662	68,755	68,531	58,708
Btu/scf (LHV)	983.9	0.0	1811.0	1542.8	2399.4	954.7
Btu/scf (HHV)	1089.7	0.0	2005.6	1708.6	2657.4	1057.3
MJ/m3	36.7	0.0	67.5	57.5	89.4	35.6
SG	0.610	1.216	1.272	1.132	1.581	0.587
Density (g/ft3)	21.2	42.2	44.1	39.3	54.9	20.4
Density (g/m3)	747.9	1490.2	1558.8	1386.3	1937.1	719.3
	mol/d	mol/d	mol/d	mol/d	mol/d	mol/d
CH_4	94.536	0.000	0.181	0.121	0.059	94.356
C_2H_6	6.284	0.000	1.967	1.935	0.032	4.317
C_3H_8	1.598	0.000	0.771	0.039	0.732	0.828
$i\text{-}C_4H_{10}$	0.232	0.000	0.131	0.007	0.125	0.101
$n\text{-}C_4H_{10}$	0.250	0.000	0.160	0.008	0.152	0.090
$i\text{-}C_5H_{12}$	0.049	0.000	0.038	0.034	0.004	0.011
$n\text{-}C_5H_{12}$	0.035	0.000	0.029	0.029	0.000	0.007
C_6+	0.031	0.000	0.030	0.030	0.000	0.001
N_2	0.281	0.281	0.001	0.001	0.000	0.280
CO	0.000	0.000	0.000	0.000	0.000	0.000
H_2	0.000	0.000	0.000	0.000	0.000	0.000
H_2S	0.000	0.000	0.000	0.000	0.000	0.000
O_2	0.000	0.000	0.000	0.000	0.000	0.000
He						
CO_2	0.232	0.232	0.222	0.221	0.001	0.010
Total	103.5	0.5	3.5	2.4	1.1	100.0

#NAME?

1646

#NAME?	#NAME?	81.40344129 MJ/gal

1.1075 0.902934537 0.902935

Mass	NG Feed	CO2	Flare	Waste Gas	LPG	LNG
	t/d	t/d	t/d			t/d
CH_4	1516.5	0.0	2.9	1.9	1.0	1513.6
C_2H_6	188.9	0.0	59.1	58.2	1.0	129.8
	0.0	0.0	0.0	0.0	0.0	
C_3H_8	70.5	0.0	34.0	1.7	32.3	36.5
i-C_4H_{10}	13.5	0.0	7.6	0.4	7.2	5.8
n-C_4H_{10}	14.5	0.0	9.3	0.5	8.9	5.2
i-C_5H_{12}	3.6	0.0	2.7	2.5	0.3	0.8
n-C_5H_{12}	2.5	0.0	2.1	2.1	0.0	0.5
C_6+	2.6	0.0	2.5	2.5	0.0	0.1
N_2	7.9	7.9	0.0	0.0	0.0	7.8
CO	0.0	0.0	0.0	0.0	0.0	0.0
H_2	0.0	0.0	0.0	0.0	0.0	0.0
H_2S	0.0	0.0	0.0	0.0	0.0	0.0
O_2	0.0	0.0	0.0	0.0	0.0	0.0
He	0.0	0.0	0.0	0.0	0.0	0.0
CO_2	10.2	10.2	9.8	9.7	0.1	0.4
Total	1830.7	18.1	130.1	79.5	50.6	1700.7
Mass ratio, base LNG	1.0765	0.0106	0.0765	0.0467	0.0298	1.00
	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	

1.0000

Upstream inputs

Natural Gas upstream WA	Emissions (g/mmBtu), LHV			
Processing Step	CO_2	CH_4	N_2O	CO_{2e}
Natural Gas Extraction	2,356	8.91	0.02	#NAME?
Extraction Fugitive	0.00	135.74	0.00	#NAME?
Natural Gas Processing	1,845	4.37	0.01	#NAME?
Processing Fugtive	778	6.83	0.00	#NAME?
Transmission & Storage	377	13.68	0.30	#NAME?
Transmisison Fugitive	0.00	19.19	0.00	#NAME?
Total	**5,355**	**189**	**0**	**#NAME?**

Natural Gas upstream BC FORTIS GIG HARBOR

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			
	CO2	CH4	N2O	
Natural Gas Extraction	2,356	9	0	#NAME?
Fugitive Emissions	0	136	0	#NAME?
Natural Gas Processing	1,845	4	0	#NAME?
Transmission	778	7	0	#NAME?
Total	**4,978**	**156**	**0**	#NAME?
				#NAME?
				#NAME?

Natural Gas upstream from PSE for Lower Sensitivity

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			#VALUE!
	CO2	CH4	N2O	#VALUE!
Natural Gas Extraction and processing	6,030	46	0.16	#NAME?
Transmission	824	6	0.02	#NAME?
				#NAME?
				#NAME?
Total	**6,854**	**51**	**0**	#NAME?
Distribution	10	2	0.00	

Power generation			Emissions (g/kWh)		
Processing Step	Code		CO_2	CH_4	N_2O
Washington	WA	Upstream	8.2	0.3800	0.0010
		Power Plants	196.0	0.0100	0.0030
Tacoma	TA	Upstream	1	0.0454	0.0001
		Power Plants	27	0.0003	0.0003
Marginal	MA	Upstream	20	0.6462	0.0026
		Power Plants	212	0.0090	0.0014
eGRID NWPP	NW	Upstream	11	0.5569	0.0010
		Power Plants	297	0.0107	0.0047

Upstream Life Cycle Data. Source: GHGenius for BC, GREET NA Natural Gas, PSE FEIS for BC inventory

GHGenius			GREET			BC Inventory	
CO2	CH4	N2O	CO2	CH4	N2O	CO2	CH4
2355.558703	8.905180223	0.020759	2126.915308	8.040794784	0.018744431	6,030	46
	135.7439715			122.5679201		824	6
1845.075523	4.371853334	0.014211	1665.982414	3.947497367	0.012831328		
777.5358703	6.830768106		702.0639913	6.167736439			
377	13.68	0.295	1650.744077	17.69875777	1.253646641		
	19.19			40.36132186			

Table 3. 2015 GHG Emissions Rates for Natural Gas Production, Transmission, and Distribution in British Columbia

BC Natural Gas GHG Emissions (grams/MMBTU)	CO_2	CH_4	N_2O	CO_2e
Natural Gas Production and Processing	6,030	45.5	0.16	7,216
Oil and Natural Gas Transmission	824	5.9	0.02	978
Natural Gas Distribution	10	2.5	0.00	67
Total	6,865	53.7	0.18	8,260
Total Ex-Distribution	6,855	51.5	0.18	8,193

Crude Oil Resource Mix	U.S. Average
API Gravity	31.2
Imported Oil	43.80%
Canadian Oil Sands	10.30%
Refinery Efficiency	
Residual Oil	94.83%
Diesel	90.92%
Product Transport	
% Marine Vessel	29%
Average Distance	8,373

	Emissions (g/mmBtu), LHV		
Processing Step	**CO_2**	**CH_4**	**N_2O**
U.S. Bunker Fuel			
Crude Oil Production	12,627		
Extraction Fugitive			
Crude Oil Refining	4,049	10.49	0.07
Processing Fugitive			
Transport	419	0.69	0.01
Transport Fugitive			
Total U.S. Bunker Fuel	**17,095**	**11**	**0**
U.S. Diesel Fuel			
Crude Oil Production	13,155		
Extraction Fugitive			
Crude Oil Refining	7,386	20.46	0.14
Processing Fugitive			
Transport	376	0.66	0.01
Transport Fugitive			
Total U.S. Diesel Fuel	**20,918**	**21**	**0**
U.S.Gasoline Fuel			
Crude Oil Production	11,533		
Extraction Fugitive			
Crude Oil Refining	13,232		
Processing Fugitive			
Transport	491		
Transport Fugitive			
Ethanol blending	-1,006		
Total WA. Gasoline Fuel	**24,251**	**0**	**0**

INPUTS - NO PROJECT

Diesel fuel storage pumping	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to vel	0.01

Loss of LNG Peak Shaving - Boiler opera	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to boi	0.01

ENDUSE

Gig harbor Delivery

Distance for LNG delivery by Diesel Truc	miles
Project	17
No Project	175

Truck capacity	gallons/trip
Capacity per trip	10,000

Energy Consumption	BTU/mile
	17,738

orizer)
orizer)

ge 118
ge 119

ge 120

N2O
0
0

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
NEW LNG Plant					
Construction Emissions					
Total Construction			**#NAME?**	**#NAME?**	**#NAME?**
Direct (Equipment)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Equipment)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Power)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Material)			#NAME?	#NAME?	#NAME?
Operational Emissions					
Upstream Life cycle			**#NAME?**	**#NAME?**	**#NAME?**
Natural Gas			#NAME?	#NAME?	#NAME?
Power LNG production			#NAME?	#NAME?	#NAME?
Diesel Emergency			#NAME?	#NAME?	#NAME?
Power LNG Vaporizer -Peak Shaving			#NAME?	#NAME?	#NAME?
Gig harbor Diesel truck fuel			#NAME?	#NAME?	#NAME?
Direct LNG Plant			**#NAME?**	**#NAME?**	**#NAME?**
LNG Production			#NAME?	#NAME?	#NAME?
Vaporizer -On-site Peak Shaving			#NAME?	#NAME?	#NAME?
Marine vessel bunkering, truck CH4			#NAME?	#NAME?	#NAME?
End Use LNG	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
On-site Peak Shaving	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor LNG	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine Diesel Pilot fuel			#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering Pilot Fuel			#NAME?	#NAME?	#NAME?
Other Marine LNG (by Bunker Barge)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine Diesel Pilot Fuel			#NAME?	#NAME?	#NAME?
Total Emissions (Tacoma LNG)			**#NAME?**	**#NAME?**	**#NAME?**

NO ACTION

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Upstream Displaced Emissions					
Total Upstream			**#NAME?**	**#NAME?**	**#NAME?**
No Peak Shaving - Diesel Dual Fuel		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Gig harbor Peak Shaving		#NAME?	#NAME?	#NAME?	#NAME?
Upstream On-road trucking		#NAME?	#NAME?	#NAME?	#NAME?
Upstream TOTE Marine Diesel		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Truck-to-Ship Bunkering		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Other Marine Diesel (by Bunker Barge)		#NAME?	#NAME?	#NAME?	#NAME?
End Use Emissions					
Total End Use Diesel /Fuel Oil/LNG	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
Diesel Peak Shaving for Power	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor LNG	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine Diesel	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine Diesel (by Bunker Barge)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Total Emission (No Action)			**#NAME?**	**#NAME?**	**#NAME?**
Net Emission reduction			**#NAME?**	**#NAME?**	**#NAME?**
in percentage			#NAME?	#NAME?	#NAME?

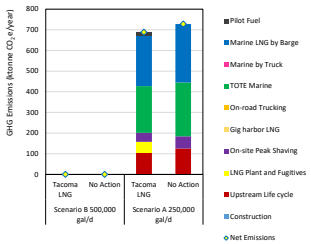
"Sankey" flow values

#NAME?	contruction
#NAME?	no power
#NAME?	power
#NAME?	power and contruction power

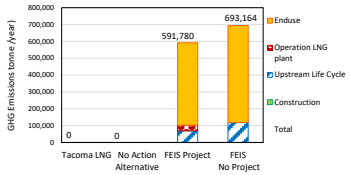
		Upstream	
	207844	**NG Upstream**	#NAME?
	154504	Diesel	Check
	51477	Power	#NAME?
	143	Const + Diesl	#NAME?
	1718		
	1		
	108998		
	94333		
	942		
	13722		
#NAME?	1082002		
#NAME?	43854		
#NAME?	8129		
#NAME?	17862		
#NAME?	226181		
	7611		
#NAME?	10575		
	356		
#NAME?	743098		
	24335		
#NAME?	**1400425**		

g/mmBtu, check

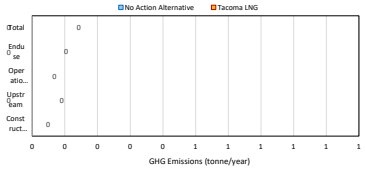
#NAME?			
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#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?		#NAME?	Gbtu
#NAME?		90000	g/mm Btu H2
#NAME?		0.01142857	Energy %
#NAME?		#NAME?	



GHG Emissions (tonne/year)	Tacoma LNG	No Action Alternative	FEIS Project	FEIS No Project
Construction	#NAME?			
Upstream Life Cycle	#NAME?	#NAME?	69,299	119,238
Operation LNG plant	#NAME?	0	33,539	0
Enduse	#NAME?	#NAME?	488,942	573,926
Total	#NAME?	#NAME?	591,780	693,164
Net Emissions	**#NAME?**		-101,385	
	#NAME?		-14.63%	



GHG Emissions (GBtu/ year)	No Action Alternative	Tacoma LNG	Net Emissions
Construction		#NAME?	
Upstream	#NAME?	#NAME?	
Operation LNG plant	0	#NAME?	
Enduse	#NAME?	#NAME?	
Total	#NAME?	#NAME?	#NAME?



GREET Emission Factors	Units				
Diesel Engine	gal	#NAME?	0.5	0.1	#NAME?
Diesel Truck	gal	#NAME?	0.6	0.0	#NAME?
Gasoline, E10	gal	#NAME?	0.3	0.1	#NAME?
Bunker Fuel	gal	#NAME?	#NAME?	#NAME?	#NAME?
Natural Gas ICE	mmBtu, HHV	#NAME?	354.3	0.1	#NAME?
Natural Gas CC Turbine	mmBtu, HHV	#NAME?	1.0	0.1	#NAME?
Natural Gas Boiler	mmBtu, HHV	#NAME?	1.0	0.7	#NAME?
Fuel gas bioler	mmBtu, HHV	#NAME?	1.0	0.7	#NAME?
Coal Boiler	tonne	#NAME?	#NAME?	#NAME?	#NAME?
EIS Emission Factors	Units				
Diesel	gal	9,500	0.0	0.0	#NAME?
Gasoline, E10	gal	8,000	0.0	0.0	#NAME?
Bunker Fuel	gal	10,500	#NAME?	#NAME?	#NAME?
Natural Gas	mmBtu, HHV	49,000	319.9	0.1	#NAME?
	Direct End Use Scenario:	#NAME?	gal/year		

		Consumption			
LNG Enduse	**Equipment Type**	**Mgal/yr**	**GBtu, LHV/yr**	**EER**	**Btu/gal**
Power Peak Shaving					
LNG	Dual Fuel Turbine	#NAME?	#NAME?	1	#NAME?
Displaced Diesel	Dual Fuel Turbine	#NAME?	#NAME?		127,464
Gig Harbor LNG					
LNG	NG Boiler	#NAME?	#NAME?	1	#NAME?
LNG	NG Boiler	#NAME?	#NAME?		#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	0.9	#NAME?
Diesel	Truck Engine	#NAME?	#NAME?		127,464
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot diesel Fuel for LNG	Marine Engine	#NAME?	#NAME?	1	127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Truck-to-Ship Bunkering					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot Fuel for LNG	Marine Engine	#NAME?	#NAME?		127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot Fuel for LNG	Marine Engine	#NAME?	#NAME?	1	127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Total LNG		#NAME?	#NAME?		

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#NAME?		Emissions (tonne/year)			
GHG Emissions	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
Power Peak Shaving					
LNG	Duct Firing	#NAME?	#NAME?	#NAME?	#NAME?
Diesel	Duct Firing	#NAME?	#NAME?	#NAME?	#NAME?
Gig Harbor Delivery					
LNG Tacoma	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG Tacoma End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
LNG End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
LNG incl. Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel Truck	Truck Engine	0	0	0.00	0
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?

Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Assume barge delivers MDO for displaced emissions					

#NAME?		
LNG Enduse	**Mgal/yr**	**GBtu, LHV/yr**
Power Peak Shaving	#NAME?	#NAME?
Gig Harbor LNG	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?
TOTE Marine	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?
Other Marine (by Bunker Barge)	#NAME?	#NAME?
Total LNG	#NAME?	#NAME?

Tacoma LNG Emissions

		Emissions (tonne/year)			
LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
LNG	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor Delivery					
LNG Tacoma	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG Tacoma End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
LNG incl. Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel Truck	Truck Engine	0	0	0	0
Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Total End Use		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Non Action

		Emissions (tonne/year)			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - Power pumping		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - End use	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor Delivery					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
Diesel	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
MDO - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
MDO fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine (by Bunker Barge)					
MDO - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
MDO fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Total End Use		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

#NAME?		Emissions (tonne/year), LHV			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - Power pumping	Power	#NAME?	#NAME?	#NAME?	#NAME?
Diesel - End use	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Total		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

LCA

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Extraction	2,356	8.9	0.021	#NAME?
Extraction Fugitive	0	135.7	0.000	#NAME?
Natural Gas Processing	1,845	4.4	0.014	#NAME?
Processing Fugtive	778	6.8	0.000	#NAME?
Transmission & Storage	377	13.7	0.295	#NAME?
Transmisison Fugitive	0.0	19.2	0.000	#NAME?
Total Natural Gas	**5,355**	**189**	**0.3**	**#NAME?**

Energy Input/Output: Based on 250,000 gal/day	NG Feed	LNG Output	ratio NG/LNG	NG Btu/gal LNG	
NG Feed (lb/day)	#NAME?	#NAME?	#NAME?		with Loss Factor
LHV (based on mass ratio see INPUT	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
LHV, Btu/gal	#NAME?	#NAME?			

Natural Gas upstream LNG	GHG Emissions (kg/1000 gal LNG)				
	CO_2	**CH_4**	**N_2O**	**CO_2e**	just CH4
Natural Gas upstream	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
					#NAME?
					#NAME?

Power generation			Emissions (g/kWh)					
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**		
Washington	WAUP	Upstream	8.2	0.3800	0.0010	#NAME?		
	WAPP	Power Plants	196.0	0.0100	0.0030	#NAME?	#NAME?	#NAME?
Tacoma	TAUP	Upstream	1.3	0.0454	0.0001	#NAME?		
	TAPP	Power Plants	27.4	0.0003	0.0003	#NAME?	#NAME?	#NAME?
Marginal	MAUP	Upstream	19.7	0.6462	0.0026	#NAME?		
	MAPP	Power Plants	212.3	0.0090	0.0014	#NAME?	#NAME?	#NAME?
eGRID NWPP	NWUP	Upstream	11.5	0.5569	0.0010	#NAME?		
	NWPP	Power Plants	297.2	0.0107	0.0047	#NAME?	#NAME?	#NAME?
Selected GEN MIX	**WA**							
Washington	**WAUP**	**Upstream**	**8.2**	**0.3800**	**0.0010**	**#NAME?**		
	WAPP	**Power Plants**	**196.0**	**0.0100**	**0.0030**	**#NAME?**		

Power Consumption LNG Construction	Baseline	GHG Emissions (tonnes)			
Power Total during construction (kWh)	10,512,000	CO_2	CH_4	N_2O	CO_2e
Mix	**WAUP**	**2,146.6**	**4.1**	**0.0**	**#NAME?**

Power Consumption LNG Production	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	1348	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**275.3**	**0.5**	**0.0**	**#NAME?**

239 GWh/year

Power Consumption Vaporizer/ Peak Shaving	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	45	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**9.2**	**0.0**	**0.0**	**#NAME?**

Comparision to reported values

Provided BID Report page 4

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Production & Processing	6,030	45.5	0.160	#NAME?
Transmission & Storage	824	5.9	0.0	#NAME?
Natural Gas Distribution	10	2.3	0	#NAME?
Total	6,864	53.70	0.18	#NAME?
Total Ex-Distribution	**6,854**	**51.40**	**0.18**	**#NAME?**

Source: Provided Report BID page 14

Table 9. Tacoma Power Generating Mix (2016)

Fuel Type	Percentage Used
Hydro Power	84%
Nuclear*	6%
Coal*	2%
Natural Gas	1%
Wind	7%

*Represents a portion of the power Tacoma Power gets from the Bonneville Power Administration.

Table 10. Upstream GHG Emissions Associated With Facility Electrical Energy Use

Source: Provided Report BID page 14

Power Consumption LNG Production		Upstream Emissions from Tacoma Power Supply					
		VOC	CO	NOx	BC	OC	CH4
Emissions Rate	grams/mmBTUel	0.65	1.63	3.83	0.02	0.05	10.92
per Power	g/kWhel	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Emissions Rate	g/mmBTU LNG	0.04	0.101	0.237	0.001	0.003	0.674
of End product	**kg/ 1000 gal**	**#NAME?**	**#NAME?**	**0.00**	**0.00**	**0.00**	**0.00**

NO PROJECT

Diesel fuel storage pumping	Consumption, Estin	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to vehicle	0.01	2.042	0.004	0.000	#NAME?
Total		2.042	0.004	0.000	#NAME?

NO PROJECT

Loss of LNG Peak Shaving - Boiler operation with	Consumption, Estin	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to boiler	0.01	2.042	0.004	0.000	#NAME?
Total		2.042	0.004	0.000	#NAME?

Crude Oil Resource Mix	U.S. Average	WA
API Gravity	31.2	30.8
Imported Oil	43.80%	37.10%
Canadian Oil Sands	10.30%	13.20%
Refinery Efficiency		
Residual Oil	94.83%	94.80%
Diesel	90.92%	90.90%
Product Transport		
% Marine Vessel	29.02%	46.00%
Average Distance	8,373.0	2,470.0

	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
WA. Bunker Fuel				
Crude Oil Production	12,627	0	0	#NAME?
Extraction Fugitive	0	0	0	#NAME?
Crude Oil Refining	4,049	10.491	0.073	#NAME?
Processing Fugitive	0	0.000	0.000	#NAME?
Transport	419	0.692	0.009	#NAME?
Transport Fugitive	0	0.000	0.000	#NAME?
Total U.S. Bunker Fuel	**17,095**	**11.18**	**0.082**	**#NAME?**
WA Diesel Fuel				
Crude Oil Production	13,155	0	0.0	#NAME?
Extraction Fugitive	0	0	0.0	#NAME?
Crude Oil Refining	7,386	20	0.1	#NAME?
Processing Fugitive	0	0	0.0	#NAME?
Transport	376	1	0.0	#NAME?
Transport Fugitive	0	0	0.0	#NAME?
Total U.S. Diesel Fuel	**20,918**	**21.11**	**0.144**	**#NAME?**
WA.Gasoline Fuel				
Crude Oil Production	11,533	0.0	0.0	11,533
Extraction Fugitive	0	0.0	0.0	
Crude Oil Refining	13,232	0.0	0.0	13,232
Processing Fugitive	0	0.0	0.0	
Transport	491	0.0	0.0	491
Transport Fugitive	0	0.0	0.0	
Ethanol blending	-1,006	0.0	0.0	-1,006
Total WA. Gasoline Fuel	**24,251**	**0.0**	**0.0**	**24,251**

PROJECT

Diesel fuel for emergency genset	Consumption	Emissions (kg/1000 gal), LHV			
Processing Step	**mmBtu/ 1000 gal LNG**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Upstream Diesel production	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Total		#NAME?	#NAME?	#NAME?	#NAME?

PROJECT

Gig Harbor Diesel Truck fuel

Upstream Diesel production	**Consumption**	**Emissions (tonne/yr), LHV**			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
LNG Project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Upstream GHG Emissions for Tacoma LNG

Pollutant	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Use Rate**	
Emissions (kg/1000 gal), LHV						
Upstream Natural Gas	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Btu/gal
Upstream Power LNG production	275.3	0.5	0.0	#NAME?	1.35	kWh/gal
Upstream Diesel Emergency	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Btu/gal
Upstream Power LNG Vaporizer	9.2	0.0	0.0	#NAME?	0.045	kWh/gal
Total Upstream	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**		

NO PROJECT

	Upstream LNG/Diesel/Bunker fuel production	**Consumption**		**Emissions (tonne/yr)**			
	Processing Step	**GBtu/year**	**Fuel**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
D	No Peak Shaving - Diesel Boiler operation	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
N	Gig harbor NG & LNG production	#NAME?	Natural Gas	#NAME?	#NAME?	#NAME?	#NAME?
D	Gig harbor Diesel truck fuel	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
D	Diesel Storage On-road trucking	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
B	TOTE Marine Diesel	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
B	Truck-to-Ship Bunkering	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
D	Other Marine Diesel	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
	Total			#NAME?	#NAME?	#NAME?	#NAME?
							#NAME?

N2O	CO2
0.09	5942.00
#NAME?	#NAME?
0.006	367.1
#NAME?	**#NAME?**

DO NOT PRINT

For Scenario Description

Displaced Activity	Fuel	Equipment Type
Diesel Dual Fuel Peak Power	Diesel	Dual Fuel Gas Turbine
Gig Harbor LNG Delivery	Diesel	Diesel Truck
On-road Trucking	Diesel	Diesel Truck
TOTE Marine	Bunker Fuel	Marine Engine
Truck-to-Ship Bunkering	Bunker Fuel	Marine Engine
Other Marine by Bunker Barge	Bunker Fuel	Marine Engine
LPG production	LPG	No activity planned

Displaced Activity	Fuel	Equipment Type
Diesel Dual Fuel Peak Power	Diesel	Dual Fuel Gas Turbine
Gig Harbor LNG Delivery	Diesel	Diesel Truck
On-road Trucking	Diesel	Diesel Truck
Marine Diesel	Bunker Fuel	Marine Engine
Truck-to-Ship Bunkering	Bunker Fuel	Marine Engine
Other Marine by Bunker Barge	Bunker Fuel	Marine Engine

Petroleum	LNG
M gal/year	**M gal/year**
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Summary of Terminal Construction Emissions - GHG PSE LNG

Equipment (Direct + Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	#NAME?	0.1	0.01	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Construction Equipment	#NAME?	0.3	0.03	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Construction Equipment	#NAME?	0.2	0.03	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Construction Equipment	#NAME?	0.1	0.02	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
Project TOTAL:	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Equipment (Direct)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	#NAME?	0.018	0.012	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	0.000	0.000	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	0.018	0.012	#NAME?
2. Year - Construction Equipment	#NAME?	0.049	0.030	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	0.002	0.001	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	0.051	0.030	#NAME?
3. Year - Construction Equipment	#NAME?	0.023	0.014	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	0.003	0.001	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	0.026	0.015	#NAME?
4. Year - Construction Equipment	#NAME?	0.028	0.017	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	0.000	0.000	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	0.028	0.017	#NAME?
Project TOTAL:	**#NAME?**	**0.123**	**0.074**	**#NAME?**

Equipment (Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	104	0.1	0.00	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Construction Equipment	221	0.2	0.00	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Construction Equipment	189	0.2	0.00	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Construction Equipment	110	0.1	0.00	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?

Project TOTAL:	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Operation hours per month	205.44

Construction Emission during 1. Year

Upstream Emiss

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
Upland Construction (demo, soil, utilities)																			
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.600	0.664	624	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	82	1.7156	0.0017
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.491	0.188	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	28	0.5763	0.0006
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.491	0.188	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	28	0.5763	0.0006
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.733	0.255	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	67	1.3976	0.0014
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.733	0.255	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	67	1.3976	0.0014
Air Compressor	2	6	55	100%	43%	1.02	1.090	0.227	590	#NAME?	0.740	0.450	#NAME?	0.0019	0.0011	#NAME?	323	6.7564	0.0068
Cat Compactor	2	6	65	85%	59%	0.73	2.600	0.664	595	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	232	4.8487	0.0049
Cat D6 Dozer	2	6	65	85%	59%	0.49	2.663	0.309	595	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	155	3.2391	0.0033
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	2.090	0.216	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	23	0.4902	0.0005
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.274	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	23	0.4902	0.0005
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.519	0.150	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	18	0.3709	0.0004
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.535	0.284	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	103	2.1627	0.0022
Fuel Truck	2	6	200	85%	59%	0.11	0.519	0.150	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	35	0.7419	0.0007
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.700	0.924	693	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	205	4.2790	0.0043
Manlifts	1	6	50	85%	21%	3.66	6.316	1.643	691	#NAME?	0.740	0.450	#NAME?	0.0028	0.0017	#NAME?	580	12.1250	0.0122
In-water Construction																			
Forklift, 8,000 lbs	2	6	65	75%	59%	0.65	2.535	0.294	595	#NAME?	0.740	0.450	#NAME?	0.0009	0.0005	#NAME?	207	4.3254	0.0044
Air Compressor	4	6	55	100%	43%	1.02	1.090	0.181	590	#NAME?	0.740	0.450	#NAME?	0.0037	0.0023	#NAME?	646	13.5127	0.0136
Crane, 60 ton	3	6	290	85%	43%	0.17	0.491	0.098	530	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	83	1.7288	0.0017
Crew Truck, 3/4 ton	3	6	250	25%	59%	0.07	2.090	0.219	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	35	0.7353	0.0007
Diesel Pile Driver Hammer	3	6	85	85%	59%	0.73	2.663	0.327	595	#NAME?	0.740	0.450	#NAME?	0.0017	0.0010	#NAME?	348	7.2730	0.0073
Flatbed Truck (Matl. Handling)	3	6	200	85%	59%	0.11	0.519	0.121	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	53	1.1128	0.0011
Fuel Truck	2	6	200	25%	59%	0.11	0.519	0.121	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	35	0.7419	0.0007
Loader, Cat 966, 4 cy	2	6	100	75%	21%	0.65	5.700	0.832	693	#NAME?	0.740	0.450	#NAME?	0.0009	0.0005	#NAME?	205	4.2790	0.0043
Personnel Work Boat	1	4.99	30	75%	45%	3.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0003	#NAME?	513	10.7362	0.0108
Tug/Work Barge w/crane	1	1.04	500	85%	45%	31.80	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0005	#NAME?	876	18.3325	0.0185
												Annual Tot	#NAME?	0.0178	0.0115	#NAME?	4969	103.9	0.1

Construction Emission during 2. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2e Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO_2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
Upland Construction (demo, soil, utilities)																			
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.330	0.606	625	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	82	1.7222	0.0017
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	27	0.5630	0.0006
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	27	0.5630	0.0006
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	66	1.3910	0.0014
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	66	1.3910	0.0014
Air Compressor	2	6	55	100%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0019	0.0011	#NAME?	323	6.7564	0.0068
Cat Compactor	2	6	65	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	231	4.8354	0.0049
Cat D6 Dozer	2	6	65	85%	59%	0.49	1.769	0.192	596	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	155	3.2457	0.0033
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	22	0.4637	0.0005
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	22	0.4637	0.0005
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	17	0.3643	0.0004
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	103	2.1528	0.0022
Fuel Truck	2	6	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	35	0.7286	0.0007
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	206	4.3055	0.0043
Manlifts	1	6	50	85%	21%	3.66	5.873	1.516	691	#NAME?	0.740	0.450	#NAME?	0.0028	0.0017	#NAME?	579	12.1217	0.0122
In-water Construction																			
Forklift, 8,000 lbs	2	1	65	75%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	34	0.7176	0.0007
Air Compressor	4	1	55	100%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0006	0.0004	#NAME?	108	2.2521	0.0023
Crane, 60 ton	3	1	290	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	13	0.2815	0.0003
Crew Truck, 3/4 ton	3	1	250	25%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	6	0.1159	0.0001
Diesel Pile Driver Hammer	3	1	85	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	58	1.2089	0.0012
Flatbed Truck (Matl. Handling)	3	1	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	9	0.1822	0.0002
Fuel Truck	2	1	200	25%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	6	0.1214	0.0001
Loader, Cat 966, 4 cy	2	1	100	75%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	34	0.7176	0.0007
Personnel Work Boat	1	1	30	75%	45%	3.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0000	0.0001	#NAME?	103	2.1528	0.0022
Tug/Work Barge w/crane	1	1	250	85%	45%	15.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0002	#NAME?	420	8.7767	0.0089
LNG Facility Construction (including Storage Tank)																			
Cat 345 Backhoe 4 cy	1	7	165	85%	21%	0.52	2.330	0.606	625	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	96	2.0092	0.0020
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	63	1.3137	0.0013
200 Ton Crawler Crane	3	7	300	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	94	1.9706	0.0020
22 Ton Hydrocrane	4	7	85	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	310	6.4914	0.0066
30 Ton Hydrocrane	3	7	100	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	233	4.8686	0.0049
Air Compressor	4	7	55	85%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0037	0.0022	#NAME?	754	15.7649	0.0159
Cat Compactor	3	7	65	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	405	8.4620	0.0085
Cat D6 Dozer	3	7	65	85%	59%	0.49	1.769	0.192	596	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	272	5.6800	0.0057
Concrete Pump	3	7	150	85%	43%	1.06	2.355	0.473	589	#NAME?	0.74	0.450	#NAME?	0.0029	0.0017	#NAME?	587	12.2873	0.0124
Crane, 60 ton	1	7	290	50%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	31	0.6569	0.0007
Crew Truck, 3/4 ton	6	7	250	85%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	78	1.6229	0.0016
Dump Trucks 15 cy	1	7	285	75%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	13	0.2705	0.0003
Flatbed Truck (Matl. Handling)	3	7	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	61	1.2751	0.0013
Forklift, 8,000 lbs	3	7	85	50%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	360	7.5347	0.0076
Fuel Truck	3	7	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	61	1.2751	0.0013
Loader, Cat 966, 4 cy	3	7	100	85%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0018	0.0011	#NAME?	360	7.5347	0.0076
Manlifts	6	7	50	85%	21%	3.66	5.873	1.516	691	#NAME?	0.740	0.450	#NAME?	0.0199	0.0121	#NAME?	4,056	84.8520	0.0856
												Annual Tob	#NAME?	0.0486	0.0298	#NAME?	10587.4376	221.4642	0.2235

Construction Emission during 3. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																			
100 Ton Crawler Crane	2	12	250	85%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	110	2.3051	0.0023
200 Ton Crawler Crane	2	12	300	85%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	110	2.3051	0.0023
22 Ton Hydrocrane	3	12	85	85%	43%	0.42	1.359	0.208	590	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	401	8.3858	0.0085
30 Ton Hydrocrane	2	12	100	85%	43%	0.42	1.359	0.208	590	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	267	5.5906	0.0056
Air Compressor	3	12	55	85%	43%	1.02	0.734	0.189	590	#NAME?	0.740	0.450	#NAME?	0.0047	0.0029	#NAME?	969	20.2691	0.0205
Cat Compactor	2	12	65	85%	59%	0.73	2.163	0.254	595	#NAME?	0.740	0.450	#NAME?	0.0023	0.0014	#NAME?	464	9.6974	0.0098
Cat D6 Dozer	2	12	65	85%	59%	0.49	1.503	0.177	596	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	310	6.4782	0.0065
Concrete Pump	2	12	150	85%	43%	1.06	2.214	0.445	589	#NAME?	0.740	0.450	#NAME?	0.0033	0.0020	#NAME?	670	14.0161	0.0141
Crane, 60 ton	1	12	290	50%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	55	1.1526	0.0012
Crew Truck, 3/4 ton	4	12	250	85%	59%	0.07	0.163	0.135	536	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	94	1.9607	0.0020
Flatbed Truck (Matl. Handling)	2	12	200	85%	59%	0.11	0.239	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	71	1.4838	0.0015
Forklift, 8,000 lbs	2	12	85	25%	59%	0.65	2.007	0.233	595	#NAME?	0.740	0.450	#NAME?	0.0006	0.0004	#NAME?	414	8.6508	0.0087
Fuel Truck	2	12	200	85%	59%	0.11	0.239	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	71	1.4838	0.0015
Loader, Cat 966, 4 cy	2	12	100	85%	21%	0.65	4.895	0.759	694	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	409	8.5581	0.0086
Manlifts	4	12	50	85%	21%	3.66	5.441	1.393	692	#NAME?	0.740	0.450	#NAME?	0.0227	0.0138	#NAME?	4,637	97.0002	0.0979
												Annual Tot	#NAME?	0.0428	0.0260	#NAME?	9,052	189	0

Construction Emission during 4. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																			
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	64	1.3446	0.0014
200 Ton Crawler Crane	2	7	300	85%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	64	1.3446	0.0014
22 Ton Hydrocrane	3	7	85	85%	43%	0.42	1.183	0.188	590	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	234	4.8917	0.0049
30 Ton Hydrocrane	2	7	100	85%	43%	0.42	1.183	0.188	590	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	156	3.2612	0.0033
Air Compressor	3	7	55	85%	43%	1.02	0.572	0.172	590	#NAME?	0.740	0.450	#NAME?	0.0031	0.0019	#NAME?	565	11.8236	0.0119
Cat Compactor	2	7	65	85%	59%	0.73	1.930	0.232	595	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	270	5.6568	0.0057
Cat D6 Dozer	2	7	65	85%	59%	0.49	1.257	0.164	596	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	181	3.7789	0.0038
Concrete Pump	2	7	150	85%	43%	1.06	2.078	0.417	589	#NAME?	0.740	0.450	#NAME?	0.0021	0.0013	#NAME?	391	8.1761	0.0083
Crane, 60 ton	1	7	290	50%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	32	0.6723	0.0007
Crew Truck, 3/4 ton	4	7	250	85%	59%	0.07	0.139	0.133	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	55	1.1437	0.0012
Flatbed Truck (Matl. Handling)	2	7	200	85%	59%	0.11	0.192	0.134	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	41	0.8655	0.0009
Forklift, 8,000 lbs	2	7	85	25%	59%	0.65	1.762	0.211	595	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	241	5.0463	0.0051
Fuel Truck	2	7	200	85%	59%	0.11	0.192	0.134	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	41	0.8655	0.0009
Loader, Cat 966, 4 cy	2	7	100	85%	21%	0.65	4.557	0.694	694	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	239	4.9922	0.0050
Manlifts	4	7	50	85%	21%	3.66	5.021	1.273	692	#NAME?	0.740	0.450	#NAME?	0.0150	0.0089	#NAME?	2,705	56.5835	0.0571
												Annual Tot	#NAME?	0.0280	0.0168	#NAME?	5,280	110	0

Notes:
- Assume 48 hours per week; 4.28 weeks per month 205 hrs/month
- Emission factors for CO, VOC, and CO2 are average NONROAD emission rates for the State of Washington.
- Emission factors for CH4 and N2O are from the Climate Registry 2014 Default Emission Factors, Table 13.7.
- Tugboat, Workboat, and Personnel Boat Emissions factors from U.S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report April 2009, Table 3-8: Harbor Craft Emission Factors (g/kWh)

Road Vehicle Terminal Construction Criteria Pollutant Emissions
PSE LNG

Construction Vehicle Emissions - Winter 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	311.0	0.0	0.0	2.83	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		38	1942.0	0.0	0.0	3.11	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	325.2	0.0	0.0	1.83	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		1,225	2017.0	0.0	0.0	3.11	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers	Seattle-Tacoma	309,120	306.0	0.0	0.0	2.68	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		9,999	1942.0	0.0	0.0	2.86	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	309,120	319.3	0.0	0.0	1.70	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		5,789	2018.0	0.0	0.0	2.86	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	302,400	300.0	0.0	0.0	2.56	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		6,356	1942.0	0.0	0.0	2.62	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	614,880	313.8	0.0	0.0	1.59	0.0	#NAME?	#NAME?	0.002	0.001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		4,160	2018.0	0.0	0.0	2.62	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.002	0.001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	295.0	0.0	0.0	2.46	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		457	1942.0	0.0	0.0	2.38	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	308.5	0.0	0.0	1.51	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		306	2019.0	0.0	0.0	2.38	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Notes:
EFs from EPA MOVES model.
Construction Worker vehicles assumed to be ID 21 - Passenger Car. Heavy-Duty Delivery trucks assumed to be 61 - Combination Short-haul truck.
Assume 48 hours per week; 4.28 weeks per month

Month/Year	Season	# of work days/ month	# of Cars/day	# of cars/ month	Car VMT/ month	# of Trucks/ month	Truck VMT/ month	Total On-Site VMT/ month (Car and Truck)
Jan-1. Year		26.6	0	0	0	0.00	0	0
Feb-1. Year	Winter 1. Year	24	0	0	0	0.00	0	0
Mar-1. Year		26.6	0	0	0	0.00	0	0
Apr-1. Year		25.7	0	0	0	0.00	0	0
May-1. Year		26.6	0	0	0	0.00	0	0
Jun-1. Year	Summer 1. Year	25.7	0	0	0	85.00	331	331
Jul-1. Year		26.6	0	0	0	85.00	320	320
Aug-1. Year		26.6	0	0	0	75.00	282	282
Sep-1. Year		25.7	0	0	0	75.00	292	292
Oct-1. Year		26.6	0	0	0	5.00	19	19
Nov-1. Year	Winter 1. Year	25.7	0	0	0	5.00	19	19
Dec-1. Year		26.6	0	0	0	0.00	0	0
Jan-2. Year		26.6	0	0	0	0.00	0	0
Feb-2. Year	Winter 2. Year	24.9	0	0	0	0.00	0	0
Mar-2. Year		26.6	0	0	0	0.00	0	0
Apr-2. Year		25.7	0	0	0	0.00	0	0
May-2. Year		26.6	0	0	0	0.00	0	0
Jun-2. Year	Summer 2. Year	25.7	0	0	0	174.00	677	677
Jul-2. Year		26.6	98	2,604	104,160	244.00	918	105,078
Aug-2. Year		26.6	98	2,604	104,160	294.00	1,106	105,266
Sep-2. Year		25.7	98	2,520	100,800	794.00	3,088	103,888
Oct-2. Year		26.6	98	2,604	104,160	844.00	3,176	107,336
Nov-2. Year	Winter 2. Year	25.7	98	2,520	100,800	894.00	3,477	104,277
Dec-2. Year		26.6	98	2,604	104,160	889.00	3,346	107,506
Jan-3. Year		26.6	98	2,604	104,160	888.00	3,342	107,502
Feb-3. Year	Winter 3. Year	24	98	2,352	94,080	329.00	1,371	95,451
Mar-3. Year		26.6	98	2,604	104,160	279.00	1,050	105,210
Apr-3. Year		25.7	98	2,520	100,800	279.00	1,085	101,885
May-3. Year		26.6	98	2,604	104,160	252.00	948	105,108
Jun-3. Year	Summer 3. Year	25.7	98	2,520	100,800	189.00	735	101,535
Jul-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Aug-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Sep-3. Year		25.7	98	2,520	100,800	89.00	346	101,146
Oct-3. Year		26.6	0	0	0	78.00	294	294
Nov-3. Year	Winter 3. Year	25.7	0	0	0	39.00	152	152
Dec-3. Year		26.6	0	0	0	39.00	147	147
Jan-4. Year		26.6	0	0	0	39.00	147	147
Feb-4. Year	Winter 4. Year	24	0	0	0	39.00	163	163
Mar-4. Year		26.6	0	0	0	39.00	147	147
Apr-4. Year		25.7	0	0	0	41.00	159	159
May-4. Year		26.6	0	0	0	39.00	147	147
Jun-4. Year	Summer 4. Year	25.7	0	0	0	0.00	0	0
Jul-4. Year		26.6	0	0	0	0.00	0	0
Aug-4. Year		26.6	0	0	0	0.00	0	0
Sep-4. Year		25.7	0	0	0	0.00	0	0
Oct-4. Year		26.6	0	0	0	0.00	0	0
Nov-4. Year	Winter 4. Year	25.7	0	0	0	0.00	0	0
Dec-4. Year		26.6	0	0	0	0.00	0	0
Total					1,535,520		28,330	

Note: Commute round-trip distance was assumed

Cars VMT round trip	40	mi/day
Truck VMT round trip	100	mi/day

Summary VMTs		Car VMT/ month	Truck VMT/ month
1.Year	Winter	0	38.00
	Summer	0	1225.00
2.Year	Winter	309,120	9999.00
	Summer	309,120	5789.00
3.Year	Winter	302,400	6356.00
	Summer	614,880	4160.00
4.Year	Winter	0	457.00
	Summer	0	306.00
Total		**1,535,520**	**28330.00**

sion Diesel production		Total
Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00009	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00007	#NAME?	#NAME?
0.00013	#NAME?	#NAME?
0.0	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00011	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00058	#NAME?	#NAME?
0.0015	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00002	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00014	#NAME?	#NAME?
0.00007	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00010	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00067	#NAME?	#NAME?
0	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00039	#NAME?	#NAME?
0	#NAME?	#NAME?

Construction Material & Power- UPSTREAM Emissions -

Input	tonnes	Source
Steel	4,745	Response Tacoma LNG Supplementary SEIS Questions, July 07, 2018, page 5
Rebar	1666.0	
Stainless Steel	290.0	
Copper	26	
Asphalt	7570.0	
Paint	5.0	
Aggregate	80110.0	
Cement	1716.0	

Pollutant	CO_2	CH_4	N_2O	CO_2e	Source
Life Cycle Emission Factor (g/kg)					
Structural Steel	2,687	4.3	0.0	#NAME?	GREET2_2017
Rebar	2,020	3.5	0.0	#NAME?	GREET2_2017
Stainless Steel	5,204	11.3	0.1	#NAME?	GREET2_2017
Copper	3,083	6.31	0.1	#NAME?	GREET2_2017
Asphalt	639	0.42	0.0	#NAME?	GREET1_2017
Aggregate	300	0.20	0.0	#NAME?	GREET1_2017
Cement	2,900	0.70	0.0	#NAME?	GREET1_2017
Emissions (tonne)					
Structural Steel	12,748	20.6	0.10	#NAME?	
Rebar	3,366	5.9	0.04	#NAME?	
Stainless Steel	1,509	3.3	0.03	#NAME?	
Copper	80.2	0.2	0.00	#NAME?	
Asphalt	4,841	3.2	0.02	#NAME?	
Aggregate	24,033	16.0	0.00	#NAME?	
Cement	4,976	1.2	0.00	#NAME?	
Total	**51,553**	**50.3**	**0.19**	**#NAME?**	

Total power consumption during construction

Consumption	10,512,000	kWh

Source: Response Tacoma LNG Supplementary SEIS Questions, july 07, 2018, page 5

Upstream Emissions Power (see sheet Upstream, B40)

Gig Harbor Peak Shaving

General inputs		
Total LNG delivery to Gig Harbor per year	#NAME?	gal
Truck capacity	10,000	gal
Number of trips	#NAME?	

Calculation of Annual Diesel Truck Consumption	LNG Project	No project	
Distance to gig harbor	17	175	miles/trip
Annual miles for delivery	#NAME?	#NAME?	miles/year
Diesel consumption per mile	**17,738**	**17,738**	**Btu/mile**
Total Diesel Consumption	**#NAME?**	**#NAME?**	**mmBtu/year**

	Diesel Consumption	**Emissions (t/year)**			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
No project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

On-road trucking

Annual Fuel delivery to tractors		Consumption	
	Equipment	Mgal/year	GBtu/year
LNG	Tractor engine	#NAME?	#NAME?
Diesel	Tractor engine	#NAME?	#NAME?

				Emissions (g/MMBTU)				Old value from BID
Pathway Component	**VOC**	**CO**	**NO_x**	**CH_4**	**N_2O**	**CO_2**	**CO_{2C}**	**CO_{2C}**
Plant-to-Tank LNG Combination								
Tank-to-Wheels LNG Combination Tractor	21.07	1,167	66.09	309.766737	0.03250653	#NAME?	#NAME?	#NAME?
Total LNG Tacoma -to-Wheels	**21.07**	**1,167**	**66.09**	**309.8**	**0.03**	**#NAME?**	**#NAME?**	**#NAME?**
Well-to-Wheels Diesel Combination Tractor	**31.52**	**94.58**	**228.4**	**4.75**	**0.18**	#NAME?	**#NAME?**	**#NAME?**
Plant-to-Tank LNG Combination Tractor	0.308	1.289	7.299	104.5	0.017	753	#NAME?	#NAME?

	Consumption	**Emissions (t/year)**			
Processing Step	**mmbtu/year**	**CO_2c**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project - LNG Tractor	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Diesel tractor	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Ship Emissions and Fuel Consumption Estimates

Route Definition

Source: 2018-05-25 PSE Submittal page 79, tables TOTE Vessel Emissions

Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	Time within 200 nm: Transit	Time within 200 nm: Maneuvering	Time within 200 nm: Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Use of extra pilot fuel for LNG Marine vessel	3%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
24	25.5	52200	400	720	Low Pressure DF LNG All	Low Pressure DF LNG All	LNG Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	LNG	LNG
Maneuvering	2.0	1,044	396	148	LNG	LNG
Hotelling	20.0	0	229	259	LNG	LNG

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	0.58	0.00	0.58	0.00	0.01	0.01	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	0.60	0.00	0.60	0.00	0.01	0.01	0.00
Emissions Rate (g/tonne MGOe)	9,376	6	9,456	17	106	105	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	3.62	0.00	3.62	0.01	0.04	0.04	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	3.64	0.00	3.64	0.01	0.04	0.04	0.00
Emissions Rate (g/tonne MGOe)	9,310	3	9,323	17	99	99	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	4.20	0.00	4.20	0.01	0.04	0.04	0.00
	0.02	0.00	0.04	0.00	0.00	0.00	0.00
	0.02	0.00	0.01	0.00	0.00	0.00	0.00
Total Emissions (tonne)	4.24	0.00	4.25	0.01	0.05	0.05	0.00
Emissions Rate (g/tonne MGOe)	9,320	3	9,342	17	100	100	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	135	0.01	1.62	#NAME?	#NAME?
	1	0.00	0.01	#NAME?	#NAME?
	3	0.00	0.01	#NAME?	#NAME?
Total Emissions (tonne)	139	0.01	1.64	#NAME?	#NAME?
Emissions Rate (g/tonne MGOe)	2,172,237	153	25,601	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	846	0.06	10.10	#NAME?	#NAME?
	1	0.00	0.01	#NAME?	#NAME?
	3	0.00	0.01	#NAME?	#NAME?
Total Emissions (tonne)	849	0.06	10.12	#NAME?	#NAME?
Emissions Rate (g/tonne MGOe)	2,172,639	152	25,881	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e	BC	OC
	981	0.07	11.71	#NAME?	#NAME?	0.01	0.00
	1	0.00	0.02	#NAME?	#NAME?	0.00	0.00
	5	0.00	0.02	#NAME?	#NAME?	0.00	0.00
Total Emissions (tonne)	988	0.07	11.75	#NAME?	#NAME?	0.01	0.00
Emissions Rate (g/tonne MGOe)	2,172,582	152	25,841	#NAME?	#NAME?	20	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Methane Slip
#NAME?
#NAME?
#NAME?

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Boiler
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8
Fuel Consumed (MT MGOe)	450.1	3.0	1.6

Within 200nm	Emissions Factors (g/kWh)									
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Outside 200nm	Emissions Factors (g/kWh)									
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Ship Emissions and Fuel Consumption Estimates

Route Definition

Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	*Time within 200 nm* Transit	Maneuvering	Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
24	25.5	52200	400	720	Medium speed diesel 2000 - 2010	Medium speed diesel 2000 - 2010	Fuel Oil Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	MGO ((	MGO (0.1% S)
Maneuvering	2.0	1,044	396	148	MGO ((	MGO (0.1% S)
Hotelling	20.0	0	229	259	MGO ((	MGO (0.1% S)

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	3.72	0.15	0.34	0.13	0.07	0.07	0.07
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	3.82	0.16	0.35	0.15	0.08	0.07	0.08
Emissions Rate (g/tonne MGO)	59,739	2,578	5,478	2,287	1,191	1,141	1,184
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	198	0.01	0.00	#NAME?	#NAME?
	1	0.00	0.00	#NAME?	#NAME?
	4	0.00	0.00	#NAME?	#NAME?
Total Emissions (tonne)	203	0.01	0.00	#NAME?	#NAME?
Emissions Rate (g/tonne MGO)	3,171,667	153	48	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	23.24	0.95	2.10	0.80	0.46	0.44	0.46
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	23.34	0.96	2.11	0.82	0.46	0.44	0.46
Emissions Rate (g/tonne MGO)	59,707	2,467	5,398	2,093	1,177	1,128	1,176
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	1,235	0.06	0.02	#NAME?	#NAME?
	1	0.00	0.00	#NAME?	#NAME?
	4	0.00	0.00	#NAME?	#NAME?
Total Emissions (tonne)	1,240	0.06	0.02	#NAME?	#NAME?
Emissions Rate (g/tonne MGO)	3,171,667	152	49	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	26.96	1.10	2.43	0.93	0.53	0.51	0.53
	0.13	0.02	0.02	0.00	0.00	0.00	0.00
	0.07	0.00	0.01	0.03	0.00	0.00	0.00
Total Emissions (tonne)	27.15	1.13	2.46	0.96	0.54	0.51	0.54
Emissions Rate (g/tonne MGO)	59,711	2,482	5,410	2,121	1,179	1,130	1,177
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e	BC	OC
	1,432	0.07	0.02	#NAME?	#NAME?	0.10	0.23
	2	0.00	0.00	#NAME?	#NAME?	0.00	0.00
	8	0.00	0.00	#NAME?	#NAME?	0.00	0.00
Total Emissions (tonne)	1,442	0.07	0.02	#NAME?	#NAME?	0.10	0.23
Emissions Rate (g/tonne MGO)	3,171,667	152	49	#NAME?	#NAME?	226	504
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Aux Boiler	
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8	
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8	Looks like LNG
Fuel Consumed (MT MGOe)	450.1	3.0	1.6	

Within 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Outside 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

EQUIPMENT INFORMATION

Component	Phase	Fluid Serviced									Emission Factors[3] (lb/hr per component)	LDAR Control Efficiency[4]
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas		
Valves	Gas/Vapor	39	9	12	36			112	185	30	0.001370	75%
	Light Liquid					33	244				0.005370	75%
	Heavy Liquid										0.000502	0%
Pump Seals	Light Liquid					1					0.049300	75%
	Heavy Liquid										0.009820	0%
Flanges/Connectors	Gas/Vapor	0	7	2	15			28	77	15	0.000559	30%
	Light Liquid					6	114				0.000559	30%
	Heavy Liquid										0.000559	30%
Compressor Seals	Gas/Vapor	0	2	0	0	0	0	1	1	0	0.016550	75%
Relief Valves	Gas/Vapor	3	0	1	3	1	19	8	9	2	0.022030	75%
Swivel Joints	Light Liquid						4				0.049300	75%

FLUID HAP/TAP CONTENT

Pollutant	CAS / ID	Fluid								
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas
Methane Content (%wt)[1]	74-82-8	100%	100%	100%	100%	100%	100%	100%	100%	100%
n-Hexane (ppmw)[1]	110-54-3	70	5.7E-10	0	1,185	210,669	27	0	1,185	1,185
Hydrogen sulfide (ppmw)[1]	2148878	3,128	0.00035	0	22	0.010	0.21	0	22	166
Benzene (ppmw)[b, 2]	71-43-2	4.0	4.0	0	4.0	4.0	4.0	0	4.0	4.0
Ethylbenzene (ppmw)[b, 2]	100-41-4	0.20	0.20	0	0.20	0.20	0.20	0	0.20	0.20
m,p-Xylene (ppmw)[b, 2]	106-42-3	1.3	1.3	0	1.3	1.3	1.3	0	1.3	1.3
o-Xylene (ppmw)[b, 2]	95-47-6	0.22	0.22	0	0.22	0.22	0.22	0	0.22	0.22
Toluene (ppmw)[b, 2]	108-88-3	3.5	3.5	0	3.5	3.5	3.5	0	3.5	3.5

POTENTIAL EMISSIONS

Pollutant	CAS / ID	Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas	Total
					Hourly Emissions[a] (lb/hr)						
Methane[c]	74-82-8	0.02988000	0.01409660	0.01040010	0.03472200	0.06448280	0.52612070	0.09751390	0.14719760	0.02715950	0.95157320
n-Hexane	110-54-3	0.00000208	0.00000000	0.00000000	0.00004113	0.01358456	0.00001441	0.00000000	0.00017437	0.00003217	0.01384873
Hydrogen sulfide	2148878	0.00009345	0.00000000	0.00000000	0.00000075	0.00000000	0.00000011	0.00000000	0.00000319	0.00000451	0.00010202
Benzene	71-43-2	0.00000012	0.00000006	0.00000000	0.00000014	0.00000026	0.00000212	0.00000000	0.00000059	0.00000011	0.00000341
Ethylbenzene	100-41-4	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000010	0.00000000	0.00000003	0.00000001	0.00000016
m,p-Xylene	106-42-3	0.00000004	0.00000002	0.00000000	0.00000005	0.00000009	0.00000070	0.00000000	0.00000020	0.00000004	0.00000113
o-Xylene	95-47-6	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000012	0.00000000	0.00000003	0.00000001	0.00000019
Toluene	108-88-3	0.00000010	0.00000005	0.00000000	0.00000012	0.00000022	0.00000183	0.00000000	0.00000051	0.00000009	0.00000294
Total HAPs	HAP	0.00000028	0.00000013	0.00000000	0.00000032	0.00000060	0.00000488	0.00000000	0.00000136	0.00000025	0.00000782
					Daily Emissions[a] (kg / day)						
Methane[c]	74-82-8	0.32528018	0.15345866	0.11321775	0.37799125	0.70197379	5.72746442	1.06155753	1.60242510	0.29566423	10.35903292
n-Hexane	110-54-3	0.00002263	0.00000000	0.00000000	0.00044777	0.14788443	0.00015692	0.00000000	0.00189824	0.00035025	0.15076024
Hydrogen sulfide	2148878	0.00101733	0.00000000	0.00000000	0.00000819	0.00000001	0.00000121	0.00000000	0.00003474	0.00004914	0.00111062
Benzene	71-43-2	0.00000131	0.00000062	0.00000000	0.00000153	0.00000283	0.00002312	0.00000000	0.00000647	0.00000119	0.00003707
Ethylbenzene	100-41-4	0.00000006	0.00000003	0.00000000	0.00000007	0.00000014	0.00000112	0.00000000	0.00000031	0.00000006	0.00000179
m,p-Xylene	106-42-3	0.00000043	0.00000020	0.00000000	0.00000050	0.00000094	0.00000765	0.00000000	0.00000214	0.00000039	0.00001227
o-Xylene	95-47-6	0.00000007	0.00000003	0.00000000	0.00000008	0.00000016	0.00000128	0.00000000	0.00000036	0.00000007	0.00000205
Toluene	108-88-3	0.00000113	0.00000053	0.00000000	0.00000132	0.00000244	0.00001994	0.00000000	0.00000558	0.00000103	0.00003197
Total HAPs	HAP	0.00000302	0.00000142	0.00000000	0.00000350	0.00000651	0.00005311	0.00000000	0.00001486	0.00000274	0.00008516
					Annual Emissions[a] (short ton per year)						
Methane[c]	74-82-8	0.13087440	0.06174311	0.04555244	0.15208236	0.28243466	2.30440867	0.42711088	0.64472549	0.11895861	4.16789062
n-Hexane	110-54-3	0.00000910	0.00000000	0.00000000	0.00018016	0.05950036	0.00006314	0.00000000	0.00076375	0.00014092	0.06065742
Hydrogen sulfide	2148878	0.00040932	0.00000000	0.00000000	0.00000330	0.00000000	0.00000049	0.00000000	0.00001398	0.00001977	0.00044685
Benzene	71-43-2	0.00000053	0.00000025	0.00000000	0.00000061	0.00000114	0.00000930	0.00000000	0.00000260	0.00000048	0.00001492
Ethylbenzene	100-41-4	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000045	0.00000000	0.00000013	0.00000002	0.00000072
m,p-Xylene	106-42-3	0.00000017	0.00000008	0.00000000	0.00000020	0.00000038	0.00000308	0.00000000	0.00000086	0.00000016	0.00000494
o-Xylene	95-47-6	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000052	0.00000000	0.00000014	0.00000003	0.00000083
Toluene	108-88-3	0.00000046	0.00000021	0.00000000	0.00000053	0.00000098	0.00000802	0.00000000	0.00000224	0.00000041	0.00001286
Total HAPs	HAP	0.00000121	0.00000057	0.00000000	0.00000141	0.00000262	0.00002137	0.00000000	0.00000598	0.00000110	0.00003426

If Capacity is 500.0
a factor of 2 is app
metric tonne&yea
#NAME?

Calculations:

[a] Hourly Emissions (lb/hr) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)]
Annual Emissions (tpy) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)] x [Hours of Operation (hrs/yr)] / [2,000 lb/ton]

Hours of Operation (hrs/yr) =	8,760	

[b] Pollutant Concentration (ppmw) = [Pollutant Concentration ($\mu g/m^3$)] / [453.6 g/lb] / [10^6 $\mu g/g$] / [35.31 ft^3/m^3] / [Gas Density (lb/cf)] x 10^6

Benzene Concentration ($\mu g/m^3$) =	2,980	[5]
Ethylbenzene Concentration ($\mu g/m^3$) =	144	[5]
m,p-Xylene Concentration ($\mu g/m^3$) =	986	[5]
o-Xylene Concentration ($\mu g/m^3$) =	165	[5]
Toluene Concentration ($\mu g/m^3$) =	2,570	[5]
Natural Gas Density (lb/scf) =	0.046	[5]

Notes:

[1] Provided by CB&I.

[2] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most HAPs will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we assume each fluid has the full concentration of HAP to provide a conservative emissions estimate.

[3] Terminal/Depot factors from South Coast Air Quality Management District's "Guidelines for Fugitive Emissions Calculations" (June 2003). In this guidance, the District updated emissions factors that were identified in the EPA's "Protocol for Equipment Leak Emission Estimates (November 1995).

[4] Control effectiveness from Texas Commission for Environmental Quality (TCEQ) "Control Efficiencies for TCEQ Leak Detection and Repair Programs" (July 2011) for its 28M fugitive leak detection program.

[5] See fuel characteristics in Table B-2.

[6] Assume all VOC is CH_4.

Life Cycle Associates, LLC

Fuel Life Cycle Factors Sheet

#NAME?

Lookup Key	AR5_100	AR5_20	AR4_100	AR4_20
AR Edition	AR5	AR5	AR4	AR4
Time Horizon	100	20	100	20
CO_2	1	1	1	1
CH_4	30	85	25	72
N_2O	265	264	298	289
BC	900	3200	900	3200
OC	-69	-240	-69	-240

Global Warming Potential, Molecular Weight

Species	GWP	Mol Wt	Variable Name GWP	MW
CO2	1.000	#NAME?	CO2_GWP	CO2_MW
CH4	25.000	#NAME?	CH4_GWP	CH4_MW
N2O	298.000	#NAME?	N2O_GWP	N2O_MW
VOC	3.117	10.209	VOC_GWP	VOC_MW
CO	1.571	#NAME?	CO_GWP	CO_MW
NO2	0.000	#NAME?	NO2_GWP	NO2_MW
BC	900.000			
OC	-69.000			
C		12.011		C_MW
H		1.008		H_MW
O		15.994		O_MW
N		14.007		N_MW
Ca		40.078		Ca_MW
Cl		35.453		Cl_MW
Na		22.990		Na_MW
S		32.065		S_MW
P		30.974		P_MW
K		39.098		K_MW

Carbon and Sulfur Ratios of Pollutants

	Ratio	Variable Name	CO_2/pollutant
Carbon ratio of VOC	0.85	VOC_C_Ratio	#NAME?
Carbon ratio of CO	#NAME?	CO_C_Ratio	#NAME?
Carbon ratio of CH4	#NAME?	CH4_C_Ratio	#NAME?
Carbon ratio of CO2	#NAME?	CO2_C_Ratio	1.00
Sulfur ratio of SO2	0.50	SO2_S_Ratio	

Conversion Factors

		Variable Name	
Energy			
J/Btu	1055.056	JperBtu	
Btu/MJ	#NAME?	BtuperMJ	
Btu/kWh	#NAME?	BtuperkWh	
Mass			
g/lb	453.597	gperlb	
metric tonne/ton	#NAME?	tonneperton	#NAME?
ton/metric tonne	1.102	shorttonpertonne	
lb/kg	#NAME?	lbperkg	
Volume			
scf/m3	35.3000	scfperm3	
L/gal	3.785	Lpergal	
Area			
acre/hectare	2.471	acreperhectare	
Distance			
cm/inch	2.54	cmperinch	
mi/naut mi	1.151	mipernaut	
ft/mi	5280		
km/mi	1.609	kmpermi	
scf/lb mol	379	scfperlbmol	
NL/g mol	22.414	Lpergmol	
Capacity			
kW/hr	1.341	kwperhp	

Emission Factors

Washington

Fuel/ Application	Equipment Type	CO_2e	CH_4	N_2O	CO_2e
GREET WTT Emissions (g/mmBtu), LHV					

Diesel	Diesel Engine	#NAME?	4.2	0.6	#NAME?
Diesel	HD Truck	#NAME?	4.7	0.2	#NAME?
Diesel	Industrial Boiler	#NAME?	0.2	0.9	#NAME?
Gasoline, E10	Gasoline Engine	#NAME?	3.0	0.6	#NAME?
Bunker Fuel	**TOTE Marine Engine**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
Bunker Fuel	**Residual Oil**	**#NAME?**	**4.2**		
Natural Gas	IC Engine	#NAME?	392	0.1	#NAME?
Natural Gas	Turbine, CC	#NAME?	1.1	0.1	#NAME?
Natural Gas	Small Boiler	#NAME?	1.1	0.4	#NAME?
Natural Gas	Large Boiler	#NAME?	1.1	0.8	#NAME?
LNG	**TOTE Marine Engine**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
LNG	**IC Engine, GREET**	#NAME?	92		
LNG	**Marine Engine, This Stud**	#NAME?			
LNG	Truck	#NAME?	309.8	0.0	#NAME?
LNG	NG Peak Shaving	#NAME?	1.1	0.4	#NAME?
LPG from Tacoma LNG	Boiler	#NAME?	1.1	1.1	#NAME?
LPG, conventional	Boiler	#NAME?	1.1	1.1	#NAME?
Waste Flare LPG - Tacoma LNG plant	Flare	#NAME?	1.1	1.1	#NAME?
Waste Flare gas - LNG plant	Flare	68,662	1.1	1.1	59,660
Fuel Gas	Boiler	#NAME?	1.1	0.8	#NAME?
Coal	Boiler	#NAME?	1.1	1.6	#NAME?

Specifications of Fuels, Global Warming Potentials of Greenhouse Gases, and Carbon and Sulfur Ratios of Pollutants #NAME? #NAME?

1) Specifications of Fuels

Fuel	Calculation:	Heating Value			Density	C ratio	S ratio	S ratio	SO_x	10	11	12	13	14	15	16		18	19	20	21	
		LHV	LHV	HHV	Density	(% by wt)	(ppm by wt)			Total C in Fuel LHV	Carbon Factor Fossil C in Fuel LHV	Biogenic C in Fuel LHV		Heating Value LHV	Heating Value HHV	Heating Value LHV	Heating Value HHV		LHV/HHV ratio	Other Properties Density		
Use LHV or HHV in calculations?	1	1 -- LHV; 2 -- HHV																				
Liquid Fuels:	**Btu/gal**	**Btu/gal**	**Btu/gal**	**g/gal**			**Ratio by Wt.**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO_2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**			**lb/gal**	**kg/L**	**Source**
Crude oil	129,670	129,670	136,392	3,206	85.3%	16,000	0.016000	395	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Conventional gasoline	116,090	116,090	124,340	2,819	86.3%	26	0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	GREET1_2012
Reformulated or low-sulfur gasoline	113,602	113,602	121,848	2,830	86.3%	26	0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Calculation
CARBOB for CARFG	113,300	113,300	124,340	2,767	85.9%	15		0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
CA reformulated gasoline	109,772	109,772	120,541	2,788	82.9%	11	0.000011	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
U.S. conventional diesel	128,450	128,450	137,380	3,167	86.5%	200	0.000200	5	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Diesel for non-road engines	128,450	128,450	137,380	3,167	86.5%	163	0.000163	4	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Low-sulfur diesel	127,464	127,464	**133,075**	**3,142**	**86.5%**	11	0.000011	0.271	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Petroleum naphtha	116,920	116,920	125,080	2,745	85.0%	1	0.000001	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
GTL naphtha	111,520	111,520	119,740	2,651	84.2%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Residual oil	140,353	140,353	150,110	3,752	86.8%	5,000	0.005000	134	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Bunker fuel for ocean tanker	140,353	140,353	150,110	3,752	86.8%	28,000	0.028000	749	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Methanol	57,250	57,250	65,200	3,006	37.5%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Ethanol	76,330	76,330	84,530	2,986	52.2%	1	0.000001	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Butanol	99,837	99,837	108,458	3,065	64.9%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Acetone	83,127	83,127	89,511	2,964	62.0%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
E-Diesel Additives	116,090	116,090	124,340	2,819	86.3%	26	0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
LPG	#NAME?	#NAME?	#NAME?	1,923	81.8%		0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Liquefied natural gas (LNG)	#NAME?	#NAME?	#NAME?	1,646	75.1%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Dimethyl ether	68,930	68,930	75,610	2,518	52.2%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Dimethoxy methane (DMM)	72,200	72,200	79,197	3,255	47.4%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Algae Oil, TAG	124,316	124,316	138,129	3,444		0	0.000000	0		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Vegetable Oil (PVO)				3,400									#NAME?	37.5	#NAME?		#NAME?			#NAME?	#NAME?	Look something u
Methyl ester (biodiesel, BD)	119,550	119,550	127,960	3,361	77.6%	0	0.000000	0	#NAME?		3,873	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Ethyl ester (biodiesel, BD)	119,550	119,550	127,960	3,500	77.6%	0			#NAME?	#NAME?	-		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
GTL Diesel	122,800	122,800	132,100	2,953	84.8%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Diesel I (SuperCetane)	117,059	117,059	125,294	2,835	87.1%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Diesel II (UOP-HDO)	122,887	122,887	130,817	2,948	87.1%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Gasoline	115,983	115,983	124,230	2,830	84.0%	0	0.000000	0	#NAME?	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Liquid hydrogen	30,500	30,500	36,020	268	0.0%	0	0.000000	0			-	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Methyl tertiary butyl ether (MTBE)	93,540	93,540	101,130	2,811	68.1%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Ethyl tertiary butyl ether (ETBE)	96,720	96,720	104,530	2,810	70.6%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Tertiary amyl methyl ether (TAME)	100,480	100,480	108,570	2,913	70.6%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Butane	94,970	94,970	103,220	2,213	82.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Isobutane	90,060	90,060	96,560	2,115	82.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Isobutylene	95,720	95,720	103,010	2,253	85.7%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Propane	84,250	84,250	91,420	1,920	81.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Natural gas liquids	83,686	83,686	90,052			0	0.000000	0					#NAME?								#NAME?	CA_GREET
Still gas (in refineries)	128,590	128,590	142,860			0	0.000000			#NAME?			#NAME?								#NAME?	CA_GREET
Gaseous Fuels (at 32F and 1atm):	**Btu/ft3**	**Btu/ft3**	**Btu/ft3**	**g/ft3**			**Ratio by Wt.**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**		**g CO_2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**			**lb/ft^**		**CA_GREET**
Natural gas	984	984	1,090	21.18	75.0%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Hydrogen	282	282	331	2.48	0.0%	0	0.000000	0	#NAME?				#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Carbon Dioxide				56.98	27.3%	0	0.000000													#NAME?		CA_GREET
Still gas (in refineries)	1,458	1,458	1,584	32.8	37.9%				#NAME?				#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Landfill Gas	446	446	496	34.54	20.5%				#NAME?				#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?	#NAME?		CA_GREET
Fuel Gas (RD I)																						CA_GREET
Shale Gas	930	930	1,030	20.40	72.4%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Flared Gas	930	930	1,030	20.40	72.4%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Propane Fuel Mix (RD II)																						CA_GREET
Solid Fuels:	**Btu/ton**	**Btu/ton**	**Btu/ton**				**Ratio by Wt.**		**g CO2/mmBtu**	**g CO2/mmBtu**		**g CO_2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**	**Btu/lb**	**MJ/unit**					**CA_GREET**
Coal	19,546,300	19,546,300	20,608,570		63.7%	11,100	0.011100		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	9773.2	10304.3	#NAME?	0.9485				CA_GREET
Bituminous coal	22,460,600	22,460,600	23,445,900		75.5%	11,800	0.011800		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	11230.3	11723.0	#NAME?	0.9580				CA_GREET
Coking coal	24,600,497	24,600,497	25,675,670		74.7%	11,800	0.011800		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	12300.2	12839.8	#NAME?	0.9580				CA_GREET
Lignite																						
Farmed trees	16,811,000	16,811,000	17,703,170		51.7%	0	0.000000		#NAME?		-	#NAME?	#NAME?	#NAME?	8405.5	8851.6	#NAME?	0.9496				CA_GREET
Herbaceous biomass	14,797,555	14,797,555	15,582,870		42.6%	0	0.000000		#NAME?		-	#NAME?	#NAME?	#NAME?	7398.8	7791.4	#NAME?	0.9496				?
Corn stover	14,075,990	14,075,990	14,974,460		44.5%	0	0.000000		#NAME?		-	#NAME?	#NAME?	#NAME?	7038.0	7487.2	#NAME?	0.9400				CA_GREET
Forest residue	13,243,490	13,243,490	14,164,160		51.7%	0	0.000000		#NAME?		-	#NAME?	#NAME?	#NAME?	6621.7	7082.1	#NAME?	0.9350				CA_GREET
Sugarcane straw					50.0%																	?
Sugarcane bagasse	12,947,318	12,947,318	14,062,678		46.3%				#NAME?		-	#NAME?	#NAME?	#NAME?	6473.7	7031.3	#NAME?	0.9207				?
Pet Coke	25,370,000	25,370,000	26,920,000		79.9%	68,000	0.068000		#NAME?	#NAME?		#NAME?	#NAME?	#NAME?	12685.0	13460.0	#NAME?	0.9424				?
Stillage solids																						
Lignin																						Jenny has someth
Jet Fuel Properties	**Btu/gal**	**Btu/gal**	**Btu/gal**	**g/gal**			**Ratio by Wt.**	**g/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO2/mmBtu**	**g CO_2/MJ**	**MJ/kg**	**MJ/kg**	**Btu/lb**		**MJ/unit**			**lb/gal**	**kg/L**	
Conventional Petroleum Jet Fuel	#NAME?	#NAME?	#NAME?	#NAME?	86.2%	700	0.000700	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	43.2	43.2	#NAME?		#NAME?			#NAME?	0.802	GREET1_2012
Ultra Low Sulfur Petroleum Jet Fuel (ULSJ)	#NAME?	#NAME?	#NAME?	#NAME?	86.0%	11	0.000011	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	43.3	43.3	#NAME?		#NAME?			#NAME?	0.792	GREET1_2012
GTL Aviation Fuel	#NAME?	#NAME?	#NAME?	#NAME?	84.7%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.1	44.1	#NAME?		#NAME?			#NAME?	0.757	GREET1_2012
GTL Lubricant Base Oil	#NAME?	#NAME?	#NAME?	#NAME?	85.1%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	41.2	41.2	#NAME?		#NAME?			#NAME?	0.8	Sasol
GTL Wax	#NAME?	#NAME?	#NAME?	#NAME?	85.0%	1	0.000001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.0	44.0	#NAME?		#NAME?			#NAME?	0.8	Sasol
Paraffin/Olefin	#NAME?	#NAME?	#NAME?	#NAME?	84.5%	2	0.000002	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.5	44.5	#NAME?		#NAME?			#NAME?	0.78	Sasol

Oxy

680

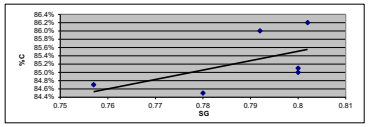
Citation
Wang (2012)
Unnasch (2009)

p.

#NAME?

ling.

86.2%
86.0%
84.7%
85.1%
85.0%
84.5%



1) Emission Factors of Fuel Combustion for Stationary Applications (grams per mmBtu of fuel burned), GREET EF Tab

	Natural Gas							Residual Oil						Diesel Fuel					Gasoline		Crude
	Utility/ Industrial Boiler (>100 mmBtu/hr input)	Small Industrial Boiler (10-100 mmBtu/hr input)	Large Gas Turbine	CC Gas Turbine	Small Turbine	Stationary Reciprocating Engine	NG Flaring in Oil Field	Utility Boiler	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Marine Vessel TOTE	Turbine	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Turbine	Farming Tractor	Stationary Reciprocating Engine	Farming Tractor	Industrial Boiler
VOC	2.540	2.540	1.056	0.267	1.056	133.316	2.500	2.089	0.905	3.651	2.027	#NAME?	0.258	0.800	1.201	2.027	0.258	63.020	598.350	193.820	0.820
CO	22.210	24.970	41.286	14.533	41.286	705.993	26.000	16.209	36.017	16.153	657.005	#NAME?	1.560	20.867	25.115	657.005	1.560	349.150	1,520.438	6,907.000	23.740
NOx	36.400	41.050	31.969	17.425	31.969	832.952	48.900	433.518	137.081	177.688	2,076.988	#NAME?	256.412	53.860	66.543	2,076.988	256.412	628.010	98.588	267.620	181.600
PM10	3.507	3.507	3.575	0.133	3.575	7.197	3.700	17.379	35.345	35.345	54.608	#NAME?	25.944	8.122	8.404	54.608	25.944	55.970	52.558	7.840	29.712
PM2.5	3.507	3.507	3.575	0.133	3.575	7.197	3.700	13.492	16.173	16.173	54.043	#NAME?	6.574	5.473	7.522	54.043	6.574	54.291	52.558	7.605	19.313
SOx	0.269	0.269	0.269	0.269	0.269	0.269	0.269	739.297	683.325	667.785	267.327	#NAME?	267.327	0.542	0.542	0.542	0.542	0.542	1.238	1.238	395.465
BC	0.579	0.579	0.104	0.004	0.104	1.439	3.515	0.855	1.025	1.025	43.937	#NAME?	0.657	0.547	0.752	43.937	0.657	30.566	5.256	1.034	0.560
OC	1.501	1.501	2.431	0.090	2.431	3.080	0.185	0.594	0.712	0.712	9.782	#NAME?	1.644	1.368	1.881	9.782	1.644	18.948	16.819	6.571	0.406
CH4	1.060	1.060	1.056	1.142	1.056	392.354	49.000	3.182	3.231	1.535	4.221	#NAME?	3.024	0.198	0.763	4.221	3.024	0.630	3.000	3.575	0.360
N2O	0.750	0.350	0.102	0.119	0.102	0.111	1.100	0.638	1.712	1.712	0.600	#NAME?	0.603	0.918	0.918	0.600	0.603	0.920	0.600	1.104	2.000
CO2	59,366.9	59,282.8	59,341.6	59,385.9	59,341.6	56,808.8	59,229.3	85,040.5	85,012.9	85,040.2	84,030.9	#NAME?	85,069.7	78,163.2	78,153.7	77,148.7	78,187.5	77,452.2	72,576.8	65,371.4	77,264.4
CO2c	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Biogenic CO2																					

#NAME?
59332.81

Coal			Diesel	Diesel	Fuel Gas	Flare Gas	LNG	LPG	LPG	LNG	LNG	LNG
Utility Boiler	IGCC Turbine	Industrial Boiler	Heavy Duty Truck	Locomotive	Industrial Boiler	Flare Gas	Heavy Duty Truck	Industrial Boiler	Flaring Tacoma	NG Peak shaving	Marine Engine TOTE CASE	Marine Engine
1.495	0.122	0.472	5.909	5.909	2.540	2.540	26.225	4.272	4.272	2.540	#NAME?	79.908
12.417	2.235	23.955	57.875	57.875	22.210	22.210	1,452.359	3.531	3.531	24.970	#NAME?	90.798
116.035	11.902	121.631	53.121	53.121	36.400	36.400	82.257	69.413	69.413	41.050	#NAME?	2,085.241
28.841	251.841	2.663	10.052	10.052	3.507	3.507	7.416	3.738	3.738	3.507	#NAME?	18.121
20.278	73.411	2.521	4.619	4.619	3.507	3.507	3.616	3.738	3.738	3.507	#NAME?	16.675
325.406	4.110	544.401	0.545	0.545	0.269	0.269	0.000	0.000	0.000	0.000	#NAME?	0.000
0.872	3.157	0.108	0.072	0.072	0.579	0.579	0.287	0.617	0.617	0.579	#NAME?	2.501
1.643	5.946	0.204	0.125	0.125	1.501	1.501	0.521	1.600	1.600	1.501	#NAME?	6.503
1.058	1.050	1.246	4.750	4.750	1.060	1.060	309.767	1.068	1.068	1.060	#NAME?	91.620
1.586	1.581	0.857	0.175	0.175	0.750	0.750	0.033	4.806	4.806	0.350	#NAME?	2.000
100,017.1	100,037.4	100,001.6	78,076.6	78,076.6	57,408.9	68,662.0	55,095.9	68,039.6	68,754.6	58,261.1	#NAME?	57,667.7
#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Factors and Activity Assumptions

Source: UPDATED 2016 Puget Sound Maritime Air Emissions Inventory, Punlished Feb 2018 APPENDIX B: OGV EMISSIONS ESTIMATING METHODOLOGY (unless otherwise noted below table)

https://pugetsoundmaritimeairforum.org/2016-puget-sound-maritime-air-emissions-inventory/

The North American ECA introduced in 2015, requiring 0.1% sulfur content in diesel fuel compared to heavy fuel oil with high sulfur content (2.7%) used by the

Table B.2: Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Slow speed diesel	< 1999	Slow speed diesel < 1999	17	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	< 1999	Medium speed diesel < 1999	13.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	16	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2(	12.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	14.4	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2(	10.5	0.5	1.1	0.42	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.00	0.02	0.02	0
Gas turbine	All	Gas turbine All	6.1	0.1	0.2	0.6	0.1	0.04	0
Steamship	All	Steamship All	2.1	0.1	0.2	0.6	0.8	0.6	0

Medium speed means RPM>130

LNG emissions factors from "GHG and NOx Emissions from Gas Fueled Engines", SINTEF, 2017. PM emissions based on EPA certification data of 2017 Wartsila DF engine (rated at 8MW).

VOC emissions for LNG engines are estimated as NMVOC, based on a typical ratio of 3.8% NMVOC/CH4 emissions, as described in "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector", MARAD, 2015

https://www.nho.no/siteassets/nhos-filer-og-bilder/filer-og-dokumenter/nox-fondet/dette-er-nox-fondet/presentasjoner-og-rapporter/methane-slip-from-gas-engines-mainreport-1492296.pdf

https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf

Sulfur emissions rates for Low Pressure DF LNG engines based on SINEF report (Table 5.1) indicating 95-98% SOx reductions from LNG operation relative to MDO. Assume pilot fuel is MDO with a 0.5% sulfur content based on 2020 global sulfur cap

Table B.2: GHG Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine Model Year	Model Year	Key	CO2	N2O	CH4
Slow speed diesel	< 1999	Slow speed diesel < 1999	589	0.0310	0.0120
Medium speed diesel	< 1999	Medium speed diesel < 1999	648	0.0310	0.0100
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	589	0.0310	0.0120
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	648	0.0310	0.0100
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	589	0.0310	0.0120
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	648	0.0310	0.0100
Gas turbine	All	Gas turbine All	922	0.0800	0.0020
Steamship	All	Steamship All	922	0.0800	0.0020
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.0310	4.1000
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.0310	5.3000 *Methane (*

N2O emissions factors for LNG engines assumed to be equal to medium speed diesel

Table B.3: Low-Load Adjustment Multipliers for Emission Factors

Load	NOx	HC	CO	PM
2%	4.63	21.18	9.68	7.29
3%	2.92	11.68	6.46	4.33
4%	2.21	7.71	4.86	3.09
5%	1.83	5.61	3.89	2.44
6%	1.6	4.35	3.25	2.04
7%	1.45	3.52	2.79	1.79
8%	1.35	2.95	2.45	1.61
9%	1.27	2.52	2.18	1.48
10%	1.22	2.2	1.96	1.38
11%	1.17	1.96	1.79	1.3
12%	1.14	1.76	1.64	1.24
13%	1.11	1.6	1.52	1.19
14%	1.08	1.47	1.41	1.15
15%	1.06	1.36	1.32	1.11
16%	1.05	1.26	1.24	1.08
17%	1.03	1.6	1.17	1.06
18%	1.02	1.18	1.11	1.04
19%	1.01	1.11	1.05	1.02
20%	1	1	1.00	1.00

Source: 2012

Table 3.17: Composite Maneuvering Load Factors

Vessel Type	Load In	Load Out
Auto Carrier	0.04	0.06
Bulk	0.04	0.05
Containership	0.03	0.03
Cruise	0.03	0.04
General Cargo	0.03	0.04
ITB	0.04	0.06
Reefer	0.02	0.03
RoRo	0.02	0.02
Tanker	0.03	0.05

Table B.7: Auxiliary Engine Emission Factors, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Medium speed diesel	≤ 1999	Medium speed diesel ≤ 1999	13.8	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2(	12.2	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2(	10.5	0.4	1.1	0.44	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0.00
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.003515	0.02	0.02	0.00

LNG emissions factors for aux engines assumed to be equivalent to main engine emissions factors as both the main and aux engines are medium speed

Table B.7: Greenhouse Gas Emission Factors for Auxiliary Engines, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Medium speed diesel	All	Medium speed diesel All	683	0.029	0.008
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	683	0.029	0.008
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	683	0.029	0.008
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.029	4.1
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.029	5.3

Table B.12: Auxiliary Boiler Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	2	0.1	0.2	6	0.18	0.15	0
LNG Aux Boiler	All	LNG Aux Boiler All	2	0.1	0.2	0	0.16	0.15	0

Source: 2013 POLB Emissions Inventory

Table B.12: Auxiliary Boiler GHG Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	922	0.075	0.002
LNG Aux Boiler	All	LNG Aux Boiler All	644	0.075	0.002

Source: 2013 POLB Emissions Inventory

CO2 emissions for LNG based on ratios of carbon-per-BTU for bunker fuel and natural gas, as given in ANL GREET's fuel properties worksheet
N2O emissions for LNG assumed to be equal to fuel oil. CH4 emissions for LNG scaled based on fuel oil emissions and ratios of CH4 emissions fro
and LNG engines.

Table B.18: 2016 Auxiliary Engine Power and Load Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling
Auto Carrier	590	1224	876
Bulk	266	384	157
Bulk - Self Discharging	462	807	258
Bulk - Heavy Load	305	1223	136
Bulk - Wood Chips	266	1275	157
Container - 1000	892	1275	536
Container - 2000	1280	1911	945
Container - 3000	888	1685	965
Container - 4000	1499	2528	1196
Container - 5000	1444	2458	1202
Container - 6000	1598	2665	1461
Container - 7000	1332	2675	1325
Container - 8000	1497	4769	1449
Container - 9000	1495	4551	1383
Container - 10000	1662	2617	887
Cruise	na	na	na
General Cargo	471	1096	829
ITB	79	208	102
Reefer	1247	1168	900
RoRo	132	396	229
Tanker - Aframax	556	628	909
Tanker - Chemical	417	583	1271
Tanker - Handysize	560	600	900
Tanker - Panamax	488	600	379
Tanker - Suezmax	858	1289	2902

Table B11 2016 Auxiliary Boiler Energy Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling *
Auto Carrier	0	184	314
Bulk	0	94	125
Bulk - Self Discharging	0	103	125
Bulk - Heavy Load	0	94	134
Bulk - Wood Chips	0	134	134
Container - 1000	0	213	273
Container - 2000	0	282	361
Container - 3000	0	328	420
Container - 4000	0	371	477
Container - 5000	0	473	579
Container - 6000	0	567	615
Container - 7000	0	470	623
Container - 8000	0	506	668
Container - 9000	0	613	677
Container - 10000	0	458	581
Cruise	0	361	306
General Cargo		124	134
ITB	0	0	0
Reefer	0	237	304
RoRo	0	148	259
Tanker - Aframax	0	438	5030
Tanker - Chemical	0	136	568
Tanker - Handysize	0	144	2586
Tanker - Panamax	0	351	3421
Tanker - Suezmax	0	191	5843

*using upper limit

Table 3.22: Fuel Correction Factors

Fuel Used	NOx	VOC	CO	SO2	PM10	PM2.5	DPM	CO2	N2O	CH4
HFO (2.7% S)	1	1	1	1	1	1	1	1	1	1
HFO (1.5% S)	1	1	1	0.555	0.82	0.82	0.82	1	1	1
MGO (0.5% S)	0.94	1	1	0.185	0.25	0.25	0.25	1	0.94	1
MDO (1.5% S)	0.94	1	1	0.555	0.47	0.47	0.47	1	0.94	1
MGO (0.1% S)	1	1	1	1	1	1	1	1	1	1
MGO (0.3% S)	0.94	1	1	0.111	0.21	0.21	0.21	1	0.94	1
MGO (0.4% S)	0.94	1	1	0.148	0.23	0.23	0.23	1	0.94	1
ULSD	1	1	1	1.2007	1.18	1.18	1.18	1	1	1
LNG	1	1	1	1	1	1	1	1	1	1

LNG fuel correction factors set to 1 as direct emissions factors already account for LNG engines meeting Tier 3 standards
ULSD factors based on scaling from 0.5%S to 0.1%S MGO and further scaling 0.1%S MGO to 0.0015%S

Fuel Consumption Factors	SFOC	Units	Source
Main Engine	204.33	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Aux Engine	215.34	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Boiler	290.71	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above

CH4) slip

m medium speed FO

Parameters	Natural Gas[a]	Flared Waste Gas[a]								
		Liquefying Case 1	Liquefying Case 2	Liquefying Case 3	Liquefying Case 4	Liquefying Case 5	Holding	LNG Transfer A1	LNG Transfer A2/A3	LNG Transfer B
Heat Content (Btu/scf)	1,093	346	466	1,644	864	1,825	1,144	506	506	223
Density (lb/scf)	0.046	0.101	0.091	0.088	0.097	0.087	0.049	0.058	0.059	0.067
Sulfur Content (ppmw)[c]	25	337	912	524	250	587	17	0	0	0
VOC Content (wt%)	NA	9.6%	14%	51%	24%	58%	17%	0.10%	0.10%	0.10%
Benzene Concentration (mg/m^3)[b]	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980
Ethylbenzene Concentration (mg/m^3)[b]	144	144	144	144	144	144	144	144	144	144
m,p-Xylene Concentration (mg/m^3)[b]	986	986	986	986	986	986	986	986	986	986
o-Xylene Concentration (mg/m^3)[b]	165	165	165	165	165	165	165	165	165	165
Toluene Concentration (mg/m^3)[b]	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570

Notes:

[a] Provided by CB&I.

[c] Based on the Williams Gas Pipeline tariff of 0.25 grains per 100 cubic feet for H2S, the past 12-month maximum total sulfur (reported as H2S by Williams Gas Pipeline) of 0.603 grains per 100 cubic feet, and sulfur from odorant of 0.23 grains per 100 cubic feet (odorant injection rates provided by PSE).

[b] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most hazardous air pollutants (HAPs) will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we conservatively assume the waste gas has the full concentration of HAP.

Do not Prin

GENERAL INPUTS

Date: 21-Sep-18
Version: 17

Comments/Source

LNG Plant Operation

0 1 if Bunker Barge Only for Scenario A

LNG Product - End use share

	Scenario A						Scenario B					Check		
LNG Production	End use share	gal/day	lb/day	Mgal/ year	tonne/ year		Enduse share	gal/day	lb/day	Mgal/ year	tonne/ year	gal/year (365)	Source: PSE-BID	Scenario A Volume Data
Total	**100.0%**	**250,000**	**#NAME?**	**88.75**	**#NAME?**		**100.00%**	**500,000**	**#NAME?**	**177.50**	**#NAME?**	182,499,845		**250,000**
On-site Peak Shaving	11.0%	27,397	#NAME?	9.73	#NAME?		5.48%	27,397	#NAME?	9.73	#NAME?	10,000,000		27,397
Gig Harbor Peak Shaving	0.0%	0	#NAME?	-	#NAME?		1.00%	5,000	#NAME?	1.78	#NAME?	1,825,000		0
On-road Trucking	0.0%	0	#NAME?	-	#NAME?		2.00%	10,000	#NAME?	3.55	#NAME?	3,650,000		0
TOTE Marine	42.7%	106,849	#NAME?	37.93	#NAME?		21.37%	106,849	#NAME?	37.93	#NAME?	39,000,000		106,849
Truck-to-Ship Bunkering	0.0%	0	#NAME?	-	#NAME?		1.00%	5,000	#NAME?	1.78	#NAME?	1,825,000		0
Other Marine (by Bunker Barge)	46.3%	115,753	#NAME?	41.09	#NAME?		69.15%	345,753	#NAME?	122.74	#NAME?	126,199,845		115,753

Results	#NAME?	#NAME?	ktonne/year

Scenario Selection for End use Mix

	Scenario	Comment
Enduse Scenario	**B**	Pull Down

	Sub- Scenario	Comment
LPG is flared	Yes	Pull Down

	EER for Marine		Range
	1	Type in	1 to 1.015

	Used GEN MIX		
Pwr Mix	**Washington**	WA	Pull Down
Natural Gas Upstream	**GHGenius**		Pull Down

Overall Operational Hours

Overall Operational Hours	hours/year	days/year
LNG Liquefaction Plant	8,520	355.0
LNG Pretreatment	8,520	355.0
LNG Flaring	8,760	365.0
LNG Vaporizer	240	10.0
Emergency Diesel Generator	500	20.8

GWP Basis		
AR Version	AR4	Pull Down
Timeframe	100	Pull Down
BC/OC	No	Pull Down
Correct BC/OC Ratios	No	Pull Down
Correct FCFs	Yes	Pull Down
Correct Fuel Heating Value	Yes	Pull Down

Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: LCA assumption 8760h/yr-240h/year (pipeline used by the vaporizer)
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

Energy/Electrcity Consumption LNG Plant

#NAME? Equipment Capacity/Consumption		PSE Estimate (mmBtu/hr)	Fuel	Calculated (mmBtu/hr)	Input for 250,000 gal /day	
LNG Pretreatment	NG WPG heater	#NAME?	NG		9	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 118
LNG Pretreatment	NG Regenerator heater	#NAME?	NG		1.6	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 119
Waste gas flaring	Waste Gas Heat Input	#NAME?		#NAME?	35.6	Source: Capacity, NG use 2018-05-25 PSE Submittal page 12
LPG in Waste Gas		77	LPG			
Waste Gas, Mass Balance		88	C2/C5+			
Vaporizer	LNG Heater Capacity	66			66	Source: Capacity, NG use 2018-05-25 PSE Submittal ATTACHMENT F page 120
		(gal/h)				
Emergency equipment	Diesel genrator	104.6	Diesel		104.6	Source: Capacity, NG use 2018-05-25 PSE Submittal page 12

WPG: Water Propylene Glycol

LNG pretreatment CO_2 seperation efficiency **99.760%** Actual result based on LNG composition

Power Consumption LNG plant	Baseline	
LNG Production	1,348	kWh/1000 gal
Vaporizer	45	kWh/1000 gal

Source: page 13, PES response

Overall Mass Balance

Mass Input/Output: Based on 500,000 gal/day	NG Feed lb / Day	LNG Output lb / Day	Mass ratio NG/LNG	Density LNG g/gal	Density LNG lb/gal
	#NAME?	#NAME?	#NAME?	1,646	#NAME?

Calculated specs for Feed Gas, Emissions and Products

Component	NG - fired NG	Pretreatment Vent	To LNG	Waste Gas	LPG	Tacoma LNG
	mol%	mol%	mol%	mol%	mol%	mol%
CH4	91.31%	0.00%	5.12%	5.01%	5.36%	94.36%
C2H6	6.07%	0.00%	55.73%	79.83%	2.86%	4.32%
						0.00%
C3H8	1.54%	0.00%	21.83%	1.59%	68.26%	0.83%
i-C4H10	0.22%	0.00%	3.72%	0.27%	11.28%	0.10%
n-C4H10	0.24%	0.00%	4.55%	0.33%	13.79%	0.09%
i-C5H12	0.05%	0.00%	1.08%	1.41%	0.34%	0.01%
n-C5H12	0.03%	0.00%	0.81%	1.18%	0.00%	0.01%
C6+	0.03%	0.00%	0.84%	1.23%	0.00%	0.00%
N2	0.27%	54.81%	0.04%	0.05%	0.00%	0.28%
CO	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H2S	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
O2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
He	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO2	0.22%	45.19%	6.29%	9.11%	0.10%	0.01%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
C factor (lb CO2/mmBtu)HHV	118.11	0.00	136.68	136.87	136.42	116.87
C factor (lb CO2/scf)	0.1287	0.0000	0.2741	0.2339	0.3625	0.1236
LHV (MJ/kg)	49.0	0.0	43.3	41.5	46.2	49.5
(g CO2/mmBtu), LHV	#NAME?	0.0	#NAME?	#NAME?	#NAME?	#NAME?
average molar weight	17.7	35.2	36.9	32.8	45.8	17.0
mol "C" per mol gas	1.11	0.45	2.36	2.01	3.12	1.06
carbon weight %	75.22%	15.40%	76.88%	73.74%	81.81%	75.10%
Carbon factor, gCO2/MJ	56.2	0.0	65.1	65.2	65.0	55.6
g CO2/mmBtu, LHV	59,333	0	68,862	68,755	68,531	58,708
Btu/scf (LHV)	983.9	0.0	1811.0	1542.8	2399.4	954.7
Btu/scf (HHV)	1089.7	0.0	2005.6	1708.6	2657.4	1057.3
MJ/m3	36.7	0.0	67.5	57.5	89.4	35.6
SG	0.610	1.216	1.272	1.132	1.581	0.587
Density (g/ft3)	21.2	42.2	44.1	39.3	54.9	20.4
Density (g/m3)	747.9	1490.2	1558.8	1386.3	1937.1	719.3
	mol/d	mol/d	mol/d	mol/d	mol/d	mol/d
CH_4	94.536	0.000	0.181	0.121	0.059	94.356
C_2H_6	6.284	0.000	1.967	1.935	0.032	4.317
C_3H_8	1.598	0.000	0.771	0.039	0.732	0.828
i-C_4H_{10}	0.232	0.000	0.131	0.007	0.125	0.101
n-C_4H_{10}	0.250	0.000	0.160	0.008	0.152	0.090
i-C_5H_{12}	0.049	0.000	0.038	0.034	0.004	0.011
n-C_5H_{12}	0.035	0.000	0.029	0.029	0.000	0.007
C_6+	0.031	0.000	0.030	0.030	0.000	0.001
N_2	0.281	0.281	0.001	0.001	0.000	0.280
CO	0.000	0.000	0.000	0.000	0.000	0.000
H_2	0.000	0.000	0.000	0.000	0.000	0.000
H_2S	0.000	0.000	0.000	0.000	0.000	0.000
O_2	0.000	0.000	0.000	0.000	0.000	0.000
He						
CO_2	0.232	0.232	0.222	0.221	0.001	0.010
Total	103.5	0.5	3.5	2.4	1.1	100.0

#NAME?

1646

#NAME?	#NAME?	81.40344129 MJ/gal

1.1075 0.902935 0.902935

Mass	NG Feed	CO2	Flare	Waste Gas	LPG	LNG	
	t/d	t/d	t/d			t/d	
CH_4	1516.5	0.0	2.9	1.9	1.0	1513.6	
C_2H_6	188.9	0.0	59.1	58.2	1.0	129.8	
	0.0	0.0	0.0	0.0	0.0		
C_3H_8	70.5	0.0	34.0	1.7	32.3	36.5	
i-C_4H_{10}	13.5	0.0	7.6	0.4	7.2	5.8	
n-C_4H_{10}	14.5	0.0	9.3	0.5	8.9	5.2	
i-C_5H_{12}	3.6	0.0	2.7	2.5	0.3	0.8	
n-C_5H_{12}	2.5	0.0	2.1	2.1	0.0	0.5	
C_6+	2.6	0.0	2.5	2.5	0.0	0.1	
N_2	7.9	7.9	0.0	0.0	0.0	7.8	
CO	0.0	0.0	0.0	0.0	0.0	0.0	
H_2	0.0	0.0	0.0	0.0	0.0	0.0	
H_2S	0.0	0.0	0.0	0.0	0.0	0.0	
O_2	0.0	0.0	0.0	0.0	0.0	0.0	
He	0.0	0.0	0.0	0.0	0.0	0.0	
CO_2	10.2	10.2	9.8	9.7	0.1	0.4	
Total	1830.7	18.1	130.1	79.5	50.6	1700.7	
Mass ratio, base LNG	1.0765	0.0106	0.0765	0.0467	0.0298	1.00	1.0000
	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		

Upstream inputs

Natural Gas upstream WA	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_{2e}**
Natural Gas Extraction	2,356	8.91	0.02	#NAME?
Extraction Fugitive	0.00	135.74	0.00	#NAME?
Natural Gas Processing	1,845	4.37	0.01	#NAME?
Processing Fugtive	778	6.83	0.00	#NAME?
Transmission & Storage	377	13.68	0.30	#NAME?
Transmisison Fugitive	0.00	19.19	0.00	#NAME?
Total	**5,355**	**189**	**0**	**#NAME?**

Natural Gas upstream BC FORTIS GIG HARBOR

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			
	CO2	**CH4**	**N2O**	
Natural Gas Extraction	2,356	9	0	#NAME?
Fugitive Emissions	0	136	0	#NAME?
Natural Gas Processing	1,845	4	0	#NAME?
Transmission	778	7	0	#NAME?
Total	**4,978**	**156**	**0**	#NAME?
				#NAME?

Natural Gas upstream from PSE for Lower Sensitivity

Natural Gas upstream BC	Emissions g/mmBTU (LHV)			
	CO2	**CH4**	**N2O**	#VALUE!
Natural Gas Extraction and processing	6,030	46	0.16	#NAME?
Transmission	824	6	0.02	#NAME?
				#NAME?
				#NAME?
Total	**6,854**	**51**	**0**	#NAME?
Distribution	10	2	0.00	

Power generation			Emissions (g/kWh)		
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**
Washington	WA	Upstream	8.2	0.3800	0.0010
		Power Plants	196.0	0.0100	0.0030
Tacoma	TA	Upstream	1	0.0454	0.0001
		Power Plants	27	0.0003	0.0003
Marginal	MA	Upstream	20	0.6462	0.0026
		Power Plants	212	0.0090	0.0014
eGRID NWPP	NW	Upstream	11	0.5569	0.0010
		Power Plants	297	0.0107	0.0047

Upstream Life Cycle Data. Source: GHGenius for BC, GREET NA Natural Gas, PSE FEIS for BC inventory

GHGenius			GREET			BC Inventory		
CO2	CH4	N2O	CO2	CH4	N2O	CO2	CH4	N2O
2355.559	8.90518	0.020759	2126.915308	8.040794784	0.018744431	6,030	46	0
	135.744			122.5679201		824	6	0
1845.076	4.371853	0.014211	1665.982414	3.947497367	0.012831328			
777.5359	6.830768		702.0639913	6.167736439				
377	13.68	0.295	1650.744077	17.69875777	1.253646641			
	19.19			40.36132186				

Table 3. 2015 GHG Emissions Rates for Natural Gas Productions, Transmission, and Distribution in British Columbia

BC Natural Gas GHG Emissions (grams/MMBTU)	CO_2	CH_4	N_2O	CO_2e
Natural Gas Production and Processing	6,030	45.5	0.16	7,216
Oil and Natural Gas Transmission	824	5.9	0.02	978
Natural Gas Distribution	10	2.5	0.00	67
Total	6,865	53.7	0.18	8,260
Total Ex-Distribution	6,855	51.5	0.18	8,193

Crude Oil Resource Mix	U.S. Average
API Gravity	31.2
Imported Oil	43.80%
Canadian Oil Sands	10.30%
Refinery Efficiency	
Residual Oil	94.83%
Diesel	90.92%
Product Transport	
% Marine Vessel	29%
Average Distance	8,373

	Emissions (g/mmBtu), LHV		
Processing Step	**CO_2**	**CH_4**	**N_2O**
U.S. Bunker Fuel			
Crude Oil Production	12,627		
Extraction Fugitive			
Crude Oil Refining	4,049	10.49	0.07
Processing Fugitive			
Transport	419	0.69	0.01
Transport Fugitive			
Total U.S. Bunker Fuel	**17,095**	**11**	**0**
U.S. Diesel Fuel			
Crude Oil Production	13,155		
Extraction Fugitive			
Crude Oil Refining	7,386	20.46	0.14
Processing Fugitive			
Transport	376	0.66	0.01
Transport Fugitive			
Total U.S. Diesel Fuel	**20,918**	**21**	**0**
U.S.Gasoline Fuel			
Crude Oil Production	11,533		
Extraction Fugitive			
Crude Oil Refining	13,232		
Processing Fugitive			
Transport	491		
Transport Fugitive			
Ethanol blending	-1,006		
Total WA. Gasoline Fuel	**24,251**	**0**	**0**

INPUTS - NO PROJECT

Diesel fuel storage pumping	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to vel	0.01

Loss of LNG Peak Shaving - Boiler opera	Consumption, Estimate
Processing Step	**kWhel/mmBtu**
Pumping Diesel fuel from tank to boi	0.01

ENDUSE

Gig harbor Delivery

Distance for LNG delivery by Diesel Tru	miles
Project	17
No Project	175

Truck capacity	gallons/trip
Capacity per trip	10,000

Energy Consumption	BTU/mile
	17,738

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
NEW LNG Plant					
Construction Emissions					
Total Construction			**#NAME?**	**#NAME?**	**#NAME?**
Direct (Equipment)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Equipment)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Power)			#NAME?	#NAME?	#NAME?
Upstream Life Cycle (Material)			#NAME?	#NAME?	#NAME?
Operational Emissions					
Upstream Life cycle			**#NAME?**	**#NAME?**	**#NAME?**
Natural Gas			#NAME?	#NAME?	#NAME?
Power LNG production			#NAME?	#NAME?	#NAME?
Diesel Emergency			#NAME?	#NAME?	#NAME?
Power LNG Vaporizer -Peak Shaving			#NAME?	#NAME?	#NAME?
Gig harbor Diesel truck fuel			#NAME?	#NAME?	#NAME?
Direct LNG Plant			**#NAME?**	**#NAME?**	**#NAME?**
LNG Production			#NAME?	#NAME?	#NAME?
Vaporizer -On-site Peak Shaving			#NAME?	#NAME?	#NAME?
Marine vessel bunkering, truck CH4			#NAME?	#NAME?	#NAME?
End Use LNG	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
On-site Peak Shaving	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor LNG	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine Diesel Pilot fuel			#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering Pilot Fuel			#NAME?	#NAME?	#NAME?
Other Marine LNG (by Bunker Barge)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine Diesel Pilot Fuel			#NAME?	#NAME?	#NAME?
Total Emissions (Tacoma LNG)			**#NAME?**	**#NAME?**	**#NAME?**

NO ACTION

Life Cycle Step	Mgal/ year	GBtu/ year	GHG Emissions tonne/year	GHG Emissions tonne/40 year	GHG Emissions kg/1000 gal
Upstream Displaced Emissions					
Total Upstream			**#NAME?**	**#NAME?**	**#NAME?**
No Peak Shaving - Diesel Dual Fuel		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Gig harbor Peak Shaving		#NAME?	#NAME?	#NAME?	#NAME?
Upstream On-road trucking		#NAME?	#NAME?	#NAME?	#NAME?
Upstream TOTE Marine Diesel		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Truck-to-Ship Bunkering		#NAME?	#NAME?	#NAME?	#NAME?
Upstream Other Marine Diesel (by Bunker Barge)		#NAME?	#NAME?	#NAME?	#NAME?
End Use Emissions					
Total End Use Diesel /Fuel Oil/LNG	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
Diesel Peak Shaving for Power	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor LNG	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine Diesel	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine Diesel (by Bunker Barge)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Total Emission (No Action)			**#NAME?**	**#NAME?**	**#NAME?**
Net Emission reduction			**#NAME?**	**#NAME?**	**#NAME?**
in percentage			#NAME?	#NAME?	#NAME?

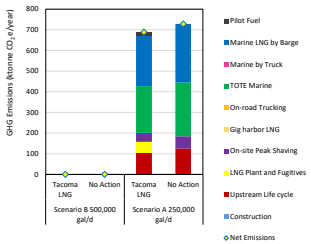
"Sankey" flow values

#NAME?	contruction
#NAME?	no power
#NAME?	power
#NAME?	power and contruction power

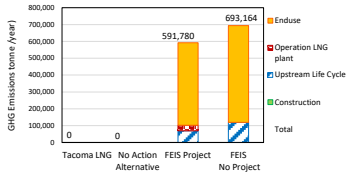
		Upstream	
	207844	**NG Upstream**	#NAME?
	154504	Diesel	Check
	51477	Power	#NAME?
	143	Const + Diesl	#NAME?
	1718		
	1		
	108998		
	94333		
	942		
	13722		
#NAME?	1082002		
#NAME?	43854		
#NAME?	8129		
#NAME?	17862		
#NAME?	226181		
	7611		
#NAME?	10575		
	356		
#NAME?	743098		
	24335		
#NAME?	**1400425**		

g/mmBtu, check

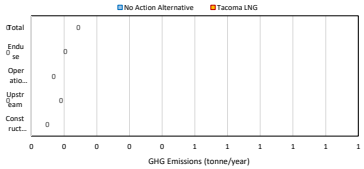
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?			
#NAME?		#NAME?	Gbtu
#NAME?		90000	g/mm Btu H2
#NAME?		0.01142857	Energy %
#NAME?		#NAME?	



GHG Emissions (tonne/year)	Tacoma LNG	No Action Alternative	FEIS Project	FEIS No Project
Construction	#NAME?			
Upstream Life Cycle	#NAME?	#NAME?	69,299	119,238
Operation LNG plant	#NAME?	0	33,539	0
Enduse	#NAME?	#NAME?	488,942	573,926
Total	#NAME?	#NAME?	591,780	693,164
Net Emissions	**#NAME?**		-101,385	
	#NAME?		-14.63%	



GHG Emissions (GBtu/ year)	No Action Alternative	Tacoma LNG	Net Emissions
Construction		#NAME?	
Upstream	#NAME?	#NAME?	
Operation LNG plant	0	#NAME?	
Enduse	#NAME?	#NAME?	
Total	#NAME?	#NAME?	#NAME?



GREET Emission Factors	Units				
Diesel Engine	gal	#NAME?	0.5	0.1	#NAME?
Diesel Truck	gal	#NAME?	0.6	0.0	#NAME?
Gasoline, E10	gal	#NAME?	0.3	0.1	#NAME?
Bunker Fuel	gal	#NAME?	#NAME?	#NAME?	#NAME?
Natural Gas ICE	mmBtu, HHV	#NAME?	354.3	0.1	#NAME?
Natural Gas CC Turbine	mmBtu, HHV	#NAME?	1.0	0.1	#NAME?
Natural Gas Boiler	mmBtu, HHV	#NAME?	1.0	0.7	#NAME?
Fuel gas bioler	mmBtu, HHV	#NAME?	1.0	0.7	#NAME?
Coal Boiler	tonne	#NAME?	#NAME?	#NAME?	#NAME?
EIS Emission Factors	Units				
Diesel	gal	9,500	0.0	0.0	#NAME?
Gasoline, E10	gal	8,000	0.0	0.0	#NAME?
Bunker Fuel	gal	10,500	#NAME?	#NAME?	#NAME?
Natural Gas	mmBtu, HHV	49,000	319.9	0.1	#NAME?
	Direct End Use Scenario:	#NAME?	gal/year		

		Consumption			
LNG Enduse	**Equipment Type**	**Mgal/yr**	**GBtu, LHV/yr**	**EER**	**Btu/gal**
Power Peak Shaving					
LNG	Dual Fuel Turbine	#NAME?	#NAME?	1	#NAME?
Displaced Diesel	Dual Fuel Turbine	#NAME?	#NAME?		127,464
Gig Harbor LNG					
LNG	NG Boiler	#NAME?	#NAME?	1	#NAME?
LNG	NG Boiler	#NAME?	#NAME?		#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	0.9	#NAME?
Diesel	Truck Engine	#NAME?	#NAME?		127,464
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot diesel Fuel for LNG	Marine Engine	#NAME?	#NAME?	1	127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Truck-to-Ship Bunkering					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot Fuel for LNG	Marine Engine	#NAME?	#NAME?		127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	1	#NAME?
Pilot Fuel for LNG	Marine Engine	#NAME?	#NAME?	1	127,464
Displaced MDO Fuel	Marine Engine	#NAME?	#NAME?		127,464
Total LNG		#NAME?	#NAME?		

T 4.2

#NAME?		Emissions (tonne/year)			
GHG Emissions	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
Power Peak Shaving					
LNG	Duct Firing	#NAME?	#NAME?	#NAME?	#NAME?
Diesel	Duct Firing	#NAME?	#NAME?	#NAME?	#NAME?
Gig Harbor Delivery					
LNG Tacoma	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG Tacoma End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
LNG End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
LNG incl. Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel Truck	Truck Engine	0	0	0.00	0
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?

Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Assume barge delivers MDO for displaced emissions					

#NAME?		
LNG Enduse	**Mgal/yr**	**GBtu, LHV/yr**
Power Peak Shaving	#NAME?	#NAME?
Gig Harbor LNG	#NAME?	#NAME?
On-road Trucking	#NAME?	#NAME?
TOTE Marine	#NAME?	#NAME?
Truck-to-Ship Bunkering	#NAME?	#NAME?
Other Marine (by Bunker Barge)	#NAME?	#NAME?
Total LNG	#NAME?	#NAME?

Tacoma LNG Emissions

		Emissions (tonne/year)			
LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
LNG	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor Delivery					
LNG Tacoma	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG Tacoma End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
LNG incl. Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Diesel Truck	Truck Engine	0	0	0	0
Other Marine (by Bunker Barge)					
LNG	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Pilot fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Total End Use		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Non Action

		Emissions (tonne/year)			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - Power pumping		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - End use	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Gig harbor Delivery					
LNG	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
LNG End Use	NG Boiler	#NAME?	#NAME?	#NAME?	#NAME?
On-road Trucking					
Diesel	Truck Engine	#NAME?	#NAME?	#NAME?	#NAME?
TOTE Marine					
MDO - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
MDO fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Truck-to-Ship Bunkering					
MDO Fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Other Marine (by Bunker Barge)					
MDO - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
MDO fuel	Marine Engine	#NAME?	#NAME?	#NAME?	#NAME?
Total End Use		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

#NAME?		Emissions (tonne/year), LHV			
NO LNG Project	**Equipment Type**	**CO_2c**	**CH_4**	**N_2O**	**CO_2e**
On-site Peak Shaving					
Diesel - Upstream		#NAME?	#NAME?	#NAME?	#NAME?
Diesel - Power pumping	Power	#NAME?	#NAME?	#NAME?	#NAME?
Diesel - End use	Dual Fuel Boiler	#NAME?	#NAME?	#NAME?	#NAME?
Total		**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

LCA

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Extraction	2,356	8.9	0.021	#NAME?
Extraction Fugitive	0	135.7	0.000	#NAME?
Natural Gas Processing	1,845	4.4	0.014	#NAME?
Processing Fugtive	778	6.8	0.000	#NAME?
Transmission & Storage	377	13.7	0.295	#NAME?
Transmisison Fugitive	0.0	19.2	0.000	#NAME?
Total Natural Gas	**5,355**	**189**	**0.3**	**#NAME?**

Comparision to reported values

Provided BID Report page 4

Natural Gas upstream	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas Production & Processing	6,030	45.5	0.160	#NAME?
Transmission & Storage	824	5.9	0.0	#NAME?
Natural Gas Distribution	10	2.3	0	#NAME?
Total	6,864	53.70	0.18	#NAME?
Total Ex-Distribution	**6,854**	**51.40**	**0.18**	**#NAME?**

Energy Input/Output: Based on 250,000 gal/day	NG Feed	LNG Output	ratio NG/LNG	NG Btu/gal LNG	
NG Feed (lb/day)	#NAME?	#NAME?	#NAME?		with Loss Factor
LHV (based on mass ratio see INPUT	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
LHV, Btu/gal	#NAME?	#NAME?			

Natural Gas upstream LNG	GHG Emissions (kg/1000 gal LNG)				
	CO_2	**CH_4**	**N_2O**	**CO_2e**	just CH4
Natural Gas upstream	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
					#NAME?
					#NAME?

Source: Provided Report BID page 14

Table 9. Tacoma Power Generating Mix (2016)

Fuel Type	Percentage Used
Hydro Power	84%
Nuclear*	6%
Coal*	2%
Natural Gas	1%
Wind	7%

*Represents a portion of the power Tacoma Power gets from the Bonneville Power Administration.

Power generation			Emissions (g/kWh)					
Processing Step	**Code**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**		
Washington	WAUP	Upstream	8.2	0.3800	0.0010	#NAME?		
	WAPP	Power Plants	196.0	0.0100	0.0030	#NAME?	#NAME?	#NAME?
Tacoma	TAUP	Upstream	1.3	0.0454	0.0001	#NAME?		
	TAPP	Power Plants	27.4	0.0003	0.0003	#NAME?	#NAME?	#NAME?
Marginal	MAUP	Upstream	19.7	0.6462	0.0026	#NAME?		
	MAPP	Power Plants	212.3	0.0090	0.0014	#NAME?	#NAME?	#NAME?
eGRID NWPP	NWUP	Upstream	11.5	0.5569	0.0010	#NAME?		
	NWPP	Power Plants	297.2	0.0107	0.0047	#NAME?	#NAME?	#NAME?
Selected GEN MIX	**WA**							
Washington	**WAUP**	**Upstream**	**8.2**	**0.3800**	**0.0010**	**#NAME?**		
	WAPP	**Power Plants**	**196.0**	**0.0100**	**0.0030**	**#NAME?**		

Table 10. Upstream GHG Emissions Associated With Facility Electrical Energy Use

Source: Provided Report BID page 14

Power Consumption LNG Production		Upstream Emissions from Tacoma Power Supply					
		VOC	CO	NOx	BC	OC	CH4
Emissions Rate	grams/mmBTUel	0.65	1.63	3.83	0.02	0.05	10.92
per Power	g/kWhel	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Emissions Rate	g/mmBTU LNG	0.04	0.101	0.237	0.001	0.003	0.674
of End product	**kg/ 1000 gal**	**#NAME?**	**#NAME?**	**0.00**	**0.00**	**0.00**	**0.00**

Power Consumption LNG Construction	Baseline	GHG Emissions (tonnes)			
Power Total during construction (kWh)	10,512,000	CO_2	CH_4	N_2O	CO_2e
Mix	**WAUP**	**2,146.6**	**4.1**	**0.0**	**#NAME?**

Power Consumption LNG Production	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	1348	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**275.3**	**0.5**	**0.0**	**#NAME?**

239 GWh/year

Power Consumption Vaporizer/ Peak Shaving	Baseline	GHG Emissions (kg/1000 gal LNG)			
Power (kWh/1000 gal)	45	CO_2	CH_4	N_2O	CO_2e
Mix	**WA**	**9.2**	**0.0**	**0.0**	**#NAME?**

NO PROJECT

Diesel fuel storage pumping	Consumption, Estin	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to vehicle	0.01	2.042	0.004	0.000	#NAME?
Total		2.042	0.004	0.000	#NAME?

NO PROJECT

Loss of LNG Peak Shaving - Boiler operation with	Consumption, Estin	Emissions (g/mmBtu), LHV			
Processing Step	**kWhel/mmBtu**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Pumping Diesel fuel from tank to boiler	0.01	2.042	0.004	0.000	#NAME?
Total		2.042	0.004	0.000	#NAME?

Crude Oil Resource Mix	U.S. Average	WA
API Gravity	31.2	30.8
Imported Oil	43.80%	37.10%
Canadian Oil Sands	10.30%	13.20%
Refinery Efficiency		
Residual Oil	94.83%	94.80%
Diesel	90.92%	90.90%
Product Transport		
% Marine Vessel	29.02%	46.00%
Average Distance	8,373.0	2,470.0

	Emissions (g/mmBtu), LHV			
Processing Step	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
WA. Bunker Fuel				
Crude Oil Production	12,627	0	0	#NAME?
Extraction Fugitive	0	0	0	#NAME?
Crude Oil Refining	4,049	10.491	0.073	#NAME?
Processing Fugitive	0	0.000	0.000	#NAME?
Transport	419	0.692	0.009	#NAME?
Transport Fugitive	0	0.000	0.000	#NAME?
Total U.S. Bunker Fuel	**17,095**	**11.18**	**0.082**	**#NAME?**
WA Diesel Fuel				
Crude Oil Production	13,155	0	0.0	#NAME?
Extraction Fugitive	0	0	0.0	#NAME?
Crude Oil Refining	7,386	20	0.1	#NAME?
Processing Fugitive	0	0	0.0	#NAME?
Transport	376	1	0.0	#NAME?
Transport Fugitive	0	0	0.0	#NAME?
Total U.S. Diesel Fuel	**20,918**	**21.11**	**0.144**	**#NAME?**
WA.Gasoline Fuel				
Crude Oil Production	11,533	0.0	0.0	11,533
Extraction Fugitive	0	0.0	0.0	
Crude Oil Refining	13,232	0.0	0.0	13,232
Processing Fugitive	0	0.0	0.0	
Transport	491	0.0	0.0	491
Transport Fugitive	0	0.0	0.0	
Ethanol blending	-1,006	0.0	0.0	-1,006
Total WA. Gasoline Fuel	**24,251**	**0.0**	**0.0**	**24,251**

PROJECT

Diesel fuel for emergency genset	Consumption	Emissions (kg/1000 gal), LHV			
Processing Step	**mmBtu/ 1000 gal LNG**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Upstream Diesel production	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Total		#NAME?	#NAME?	#NAME?	#NAME?

PROJECT

Gig Harbor Diesel Truck fuel

Upstream Diesel production	**Consumption**	**Emissions (tonne/yr), LHV**			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
LNG Project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Upstream GHG Emissions for Tacoma LNG

Pollutant	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Use Rate**	
Emissions (kg/1000 gal), LHV						
Upstream Natural Gas	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Btu/gal
Upstream Power LNG production	275.3	0.5	0.0	#NAME?	1.35	kWh/gal
Upstream Diesel Emergency	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Btu/gal
Upstream Power LNG Vaporizer	9.2	0.0	0.0	#NAME?	0.045	kWh/gal
Total Upstream	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**		

NO PROJECT

	Upstream LNG/Diesel/Bunker fuel production	**Consumption**		**Emissions (tonne/yr)**			
	Processing Step	**GBtu/year**	**Fuel**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
D	No Peak Shaving - Diesel Boiler operation	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
N	Gig harbor NG & LNG production	#NAME?	Natural Gas	#NAME?	#NAME?	#NAME?	#NAME?
D	Gig harbor Diesel truck fuel	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
D	Diesel Storage On-road trucking	#NAME?	Diesel	#NAME?	#NAME?	#NAME?	#NAME?
B	TOTE Marine Diesel	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
B	Truck-to-Ship Bunkering	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
D	Other Marine Diesel	#NAME?	MDO	#NAME?	#NAME?	#NAME?	#NAME?
	Total			#NAME?	#NAME?	#NAME?	#NAME?
							#NAME?

N2O	CO2
0.09	5942.00
#NAME?	#NAME?
0.006	367.1
#NAME?	**#NAME?**

DO NOT PRINT

For Scenario Description

Displaced Activity	Fuel	Equipment Type
Diesel Dual Fuel Peak Power	Diesel	Dual Fuel Gas Turbine
Gig Harbor LNG Delivery	Diesel	Diesel Truck
On-road Trucking	Diesel	Diesel Truck
TOTE Marine	Bunker Fuel	Marine Engine
Truck-to-Ship Bunkering	Bunker Fuel	Marine Engine
Other Marine by Bunker Barge	Bunker Fuel	Marine Engine
LPG production	LPG	No activity planned

Displaced Activity	Fuel	Equipment Type
Diesel Dual Fuel Peak Power	Diesel	Dual Fuel Gas Turbine
Gig Harbor LNG Delivery	Diesel	Diesel Truck
On-road Trucking	Diesel	Diesel Truck
Marine Diesel	Bunker Fuel	Marine Engine
Truck-to-Ship Bunkering	Bunker Fuel	Marine Engine
Other Marine by Bunker Barge	Bunker Fuel	Marine Engine

Petroleum	LNG
M gal/year	**M gal/year**
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?

Do Not Print

Summary of Terminal Construction Emissions - GHG PSE LNG

Equipment (Direct + Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	#NAME?	0.1	0.01	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Construction Equipment	#NAME?	0.3	0.03	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Construction Equipment	#NAME?	0.2	0.03	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Construction Equipment	#NAME?	0.1	0.02	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
Project TOTAL:	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Equipment (Direct)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	#NAME?	0.018	0.012	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	0.000	0.000	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	0.018	0.012	#NAME?
2. Year - Construction Equipment	#NAME?	0.049	0.030	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	0.002	0.001	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	0.051	0.030	#NAME?
3. Year - Construction Equipment	#NAME?	0.023	0.014	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	0.003	0.001	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	0.026	0.015	#NAME?
4. Year - Construction Equipment	#NAME?	0.028	0.017	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	0.000	0.000	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	0.028	0.017	#NAME?
Project TOTAL:	**#NAME?**	**0.123**	**0.074**	**#NAME?**

Equipment (Upstream)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)
1. Year - Construction Equipment	104	0.1	0.00	#NAME?
1. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
1. Year - Fugitive Dust				#NAME?
1. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Construction Equipment	221	0.2	0.00	#NAME?
2. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
2. Year - Fugitive Dust				#NAME?
2. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Construction Equipment	189	0.2	0.00	#NAME?
3. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
3. Year - Fugitive Dust				#NAME?
3. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Construction Equipment	110	0.1	0.00	#NAME?
4. Year - Road Vehicles/Commuting	#NAME?	#NAME?	#NAME?	#NAME?
4. Year - Fugitive Dust				#NAME?
4. Year - Total Emissions	#NAME?	#NAME?	#NAME?	#NAME?

Project TOTAL:	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Operation hours per month	205.44

Construction Emission during 1. Year

Upstream Emis

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
Upland Construction (demo, soil, utilities)																			
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.600	0.664	624	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	82	1.7156	0.0017
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.491	0.188	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	28	0.5763	0.0006
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.491	0.188	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	28	0.5763	0.0006
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.733	0.255	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	67	1.3976	0.0014
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.733	0.255	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	67	1.3976	0.0014
Air Compressor	2	6	55	100%	43%	1.02	1.090	0.227	590	#NAME?	0.740	0.450	#NAME?	0.0019	0.0011	#NAME?	323	6.7564	0.0068
Cat Compactor	2	6	65	85%	59%	0.73	2.600	0.664	595	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	232	4.8487	0.0049
Cat D6 Dozer	2	6	65	85%	59%	0.49	2.663	0.309	595	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	155	3.2391	0.0033
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	2.090	0.216	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	23	0.4902	0.0005
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.274	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	23	0.4902	0.0005
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.519	0.150	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	18	0.3709	0.0004
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.535	0.284	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	103	2.1627	0.0022
Fuel Truck	2	6	200	85%	59%	0.11	0.519	0.150	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	35	0.7419	0.0007
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.700	0.924	693	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	205	4.2790	0.0043
Manlifts	1	6	50	85%	21%	3.66	6.316	1.643	691	#NAME?	0.740	0.450	#NAME?	0.0028	0.0017	#NAME?	580	12.1250	0.0122
In-water Construction																			
Forklift, 8,000 lbs	2	6	65	75%	59%	0.65	2.535	0.294	595	#NAME?	0.740	0.450	#NAME?	0.0009	0.0005	#NAME?	207	4.3254	0.0044
Air Compressor	4	6	55	100%	43%	1.02	1.090	0.181	590	#NAME?	0.740	0.450	#NAME?	0.0037	0.0023	#NAME?	646	13.5127	0.0136
Crane, 60 ton	3	6	290	85%	43%	0.17	0.491	0.098	530	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	83	1.7288	0.0017
Crew Truck, 3/4 ton	3	6	250	25%	59%	0.07	2.090	0.219	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	35	0.7353	0.0007
Diesel Pile Driver Hammer	3	6	85	85%	59%	0.73	2.663	0.327	595	#NAME?	0.740	0.450	#NAME?	0.0017	0.0010	#NAME?	348	7.2730	0.0073
Flatbed Truck (Matl. Handling)	3	6	200	85%	59%	0.11	0.519	0.121	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	53	1.1128	0.0011
Fuel Truck	2	6	200	25%	59%	0.11	0.519	0.121	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	35	0.7419	0.0007
Loader, Cat 966, 4 cy	2	6	100	75%	21%	0.65	5.700	0.832	693	#NAME?	0.740	0.450	#NAME?	0.0009	0.0005	#NAME?	205	4.2790	0.0043
Personnel Work Boat	1	4.99	30	75%	45%	3.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0003	#NAME?	513	10.7362	0.0108
Tug/Work Barge w/crane	1	1.04	500	85%	45%	31.80	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0005	#NAME?	876	18.3325	0.0185
												Annual Tota	#NAME?	0.0178	0.0115	#NAME?	4969	103.9	0.1

Construction Emission during 2. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO_2 Emission Factor (g/hp-hr)	CO_2e Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO_2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
Upland Construction (demo, soil, utilities)																			
Cat 345 Backhoe 4 cy	1	6	165	75%	21%	0.52	2.330	0.606	625	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	82	1.7222	0.0017
100 Ton Crawler Crane	1	6	250	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	27	0.5630	0.0006
200 Ton Crawler Crane	1	6	300	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	27	0.5630	0.0006
22 Ton Hydrocrane	1	6	85	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	66	1.3910	0.0014
30 Ton Hydrocrane	1	6	100	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	66	1.3910	0.0014
Air Compressor	2	6	55	100%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0019	0.0011	#NAME?	323	6.7564	0.0068
Cat Compactor	2	6	65	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	231	4.8354	0.0049
Cat D6 Dozer	2	6	65	85%	59%	0.49	1.769	0.192	596	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	155	3.2457	0.0033
Crew Truck, 3/4 ton	2	6	250	85%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	22	0.4637	0.0005
Dump Trucks 15 cy	2	6	285	75%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	22	0.4637	0.0005
Flatbed Truck (Matl. Handling)	1	6	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	17	0.3643	0.0004
Forklift, 8,000 lbs	1	6	85	50%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	103	2.1528	0.0022
Fuel Truck	2	6	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	35	0.7286	0.0007
Loader, Cat 966, 4 cy	2	6	100	85%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	206	4.3055	0.0043
Manlifts	1	6	50	85%	21%	3.66	5.873	1.516	691	#NAME?	0.740	0.450	#NAME?	0.0028	0.0017	#NAME?	579	12.1217	0.0122
In-water Construction																			
Forklift, 8,000 lbs	2	1	65	75%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	34	0.7176	0.0007
Air Compressor	4	1	55	100%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0006	0.0004	#NAME?	108	2.2521	0.0023
Crane, 60 ton	3	1	290	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	13	0.2815	0.0003
Crew Truck, 3/4 ton	3	1	250	25%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	6	0.1159	0.0001
Diesel Pile Driver Hammer	3	1	85	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	58	1.2089	0.0012
Flatbed Truck (Matl. Handling)	3	1	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	9	0.1822	0.0002
Fuel Truck	2	1	200	25%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0000	0.0000	#NAME?	6	0.1214	0.0001
Loader, Cat 966, 4 cy	2	1	100	75%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	34	0.7176	0.0007
Personnel Work Boat	1	1	30	75%	45%	3.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0000	0.0001	#NAME?	103	2.1528	0.0022
Tug/Work Barge w/crane	1	1	250	85%	45%	15.90	#NAME?	#NAME?	#NAME?	#NAME?	0.020	0.090	#NAME?	0.0001	0.0002	#NAME?	420	8.7767	0.0089
LNG Facility Construction (including Storage Tank)																			
Cat 345 Backhoe 4 cy	1	7	165	85%	21%	0.52	2.330	0.606	625	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	96	2.0092	0.0020
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	63	1.3137	0.0013
200 Ton Crawler Crane	3	7	300	85%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	94	1.9706	0.0020
22 Ton Hydrocrane	4	7	85	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	310	6.4914	0.0066
30 Ton Hydrocrane	3	7	100	85%	43%	0.42	1.542	0.230	590	#NAME?	0.740	0.450	#NAME?	0.0011	0.0007	#NAME?	233	4.8686	0.0049
Air Compressor	4	7	55	85%	43%	1.02	0.908	0.207	590	#NAME?	0.740	0.450	#NAME?	0.0037	0.0022	#NAME?	754	15.7649	0.0159
Cat Compactor	3	7	65	85%	59%	0.73	2.408	0.280	595	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	405	8.4620	0.0085
Cat D6 Dozer	3	7	65	85%	59%	0.49	1.769	0.192	596	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	272	5.6800	0.0057
Concrete Pump	3	7	150	85%	43%	1.06	2.355	0.473	589	#NAME?	0.74	0.450	#NAME?	0.0029	0.0017	#NAME?	587	12.2873	0.0124
Crane, 60 ton	1	7	290	50%	43%	0.17	0.429	0.175	530	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	31	0.6569	0.0007
Crew Truck, 3/4 ton	6	7	250	85%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	78	1.6229	0.0016
Dump Trucks 15 cy	1	7	285	75%	59%	0.07	0.203	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0001	0.0000	#NAME?	13	0.2705	0.0003
Flatbed Truck (Matl. Handling)	3	7	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	61	1.2751	0.0013
Forklift, 8,000 lbs	3	7	85	50%	59%	0.65	2.265	0.257	595	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	360	7.5347	0.0076
Fuel Truck	3	7	200	85%	59%	0.11	0.322	0.141	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	61	1.2751	0.0013
Loader, Cat 966, 4 cy	3	7	100	85%	21%	0.65	5.288	0.839	693	#NAME?	0.740	0.450	#NAME?	0.0018	0.0011	#NAME?	360	7.5347	0.0076
Manlifts	6	7	50	85%	21%	3.66	5.873	1.516	691	#NAME?	0.740	0.450	#NAME?	0.0199	0.0121	#NAME?	4,056	84.8520	0.0856
												Annual Tota	#NAME?	0.0486	0.0298	#NAME?	10587.4376	221.4642	0.2235

Construction Emission during 3. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																			
100 Ton Crawler Crane	2	12	250	85%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	110	2.3051	0.0023
200 Ton Crawler Crane	2	12	300	85%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	110	2.3051	0.0023
22 Ton Hydrocrane	3	12	85	85%	43%	0.42	1.359	0.208	590	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	401	8.3858	0.0085
30 Ton Hydrocrane	2	12	100	85%	43%	0.42	1.359	0.208	590	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	267	5.5906	0.0056
Air Compressor	3	12	55	85%	43%	1.02	0.734	0.189	590	#NAME?	0.740	0.450	#NAME?	0.0047	0.0029	#NAME?	969	20.2691	0.0205
Cat Compactor	2	12	65	85%	59%	0.73	2.163	0.254	595	#NAME?	0.740	0.450	#NAME?	0.0023	0.0014	#NAME?	464	9.6974	0.0098
Cat D6 Dozer	2	12	65	85%	59%	0.49	1.503	0.177	596	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	310	6.4782	0.0065
Concrete Pump	2	12	150	85%	43%	1.06	2.214	0.445	589	#NAME?	0.740	0.450	#NAME?	0.0033	0.0020	#NAME?	670	14.0161	0.0141
Crane, 60 ton	1	12	290	50%	43%	0.17	0.371	0.166	531	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	55	1.1526	0.0012
Crew Truck, 3/4 ton	4	12	250	85%	59%	0.07	0.163	0.135	536	#NAME?	0.740	0.450	#NAME?	0.0005	0.0003	#NAME?	94	1.9607	0.0020
Flatbed Truck (Matl. Handling)	2	12	200	85%	59%	0.11	0.239	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	71	1.4838	0.0015
Forklift, 8,000 lbs	2	12	85	25%	59%	0.65	2.007	0.233	595	#NAME?	0.740	0.450	#NAME?	0.0006	0.0004	#NAME?	414	8.6508	0.0087
Fuel Truck	2	12	200	85%	59%	0.11	0.239	0.137	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	71	1.4838	0.0015
Loader, Cat 966, 4 cy	2	12	100	85%	21%	0.65	4.895	0.759	694	#NAME?	0.740	0.450	#NAME?	0.0020	0.0012	#NAME?	409	8.5581	0.0086
Manlifts	4	12	50	85%	21%	3.66	5.441	1.393	692	#NAME?	0.740	0.450	#NAME?	0.0227	0.0138	#NAME?	4,637	97.0002	0.0979
												Annual Tota	#NAME?	0.0428	0.0260	#NAME?	9,052	189	0

Construction Emission during 4. Year

Equipment List	No.	Equipment Use Duration (months)	Horsepower	Utilization	Load Factor	Fuel Use Rate (gal/hr)	CO Emission Factor (g/hp-hr)	VOC Emission Factor (g/hp-hr)	CO2 Emission Factor (g/hp-hr)	CO2c Emission Factor (g/hp-hr)	CH_4 Emission Factor (g/gal)	N_2O Emission Factor (g/gal)	CO2c (tonne/ year)	CH4 (tonne/ year)	N2O (tonne/ year)	CO2e use (tonne/ year)	Fuel consumption (mmBtu/year)	Upstream CO2 (tonne/ year)	Upstream CH4 (tonne/ year)
LNG Facility Construction (no Storage Tank Construction)																			
100 Ton Crawler Crane	2	7	250	85%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	64	1.3446	0.0014
200 Ton Crawler Crane	2	7	300	85%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	64	1.3446	0.0014
22 Ton Hydrocrane	3	7	85	85%	43%	0.42	1.183	0.188	590	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	234	4.8917	0.0049
30 Ton Hydrocrane	2	7	100	85%	43%	0.42	1.183	0.188	590	#NAME?	0.740	0.450	#NAME?	0.0008	0.0005	#NAME?	156	3.2612	0.0033
Air Compressor	3	7	55	85%	43%	1.02	0.572	0.172	590	#NAME?	0.740	0.450	#NAME?	0.0031	0.0019	#NAME?	565	11.8236	0.0119
Cat Compactor	2	7	65	85%	59%	0.73	1.930	0.232	595	#NAME?	0.740	0.450	#NAME?	0.0015	0.0009	#NAME?	270	5.6568	0.0057
Cat D6 Dozer	2	7	65	85%	59%	0.49	1.257	0.164	596	#NAME?	0.740	0.450	#NAME?	0.0010	0.0006	#NAME?	181	3.7789	0.0038
Concrete Pump	2	7	150	85%	43%	1.06	2.078	0.417	589	#NAME?	0.740	0.450	#NAME?	0.0021	0.0013	#NAME?	391	8.1761	0.0083
Crane, 60 ton	1	7	290	50%	43%	0.17	0.317	0.159	531	#NAME?	0.740	0.450	#NAME?	0.0001	0.0001	#NAME?	32	0.6723	0.0007
Crew Truck, 3/4 ton	4	7	250	85%	59%	0.07	0.139	0.133	536	#NAME?	0.740	0.450	#NAME?	0.0003	0.0002	#NAME?	55	1.1437	0.0012
Flatbed Truck (Matl. Handling)	2	7	200	85%	59%	0.11	0.192	0.134	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	41	0.8655	0.0009
Forklift, 8,000 lbs	2	7	85	25%	59%	0.65	1.762	0.211	595	#NAME?	0.740	0.450	#NAME?	0.0004	0.0002	#NAME?	241	5.0463	0.0051
Fuel Truck	2	7	200	85%	59%	0.11	0.192	0.134	536	#NAME?	0.740	0.450	#NAME?	0.0002	0.0001	#NAME?	41	0.8655	0.0009
Loader, Cat 966, 4 cy	2	7	100	85%	21%	0.65	4.557	0.694	694	#NAME?	0.740	0.450	#NAME?	0.0013	0.0008	#NAME?	239	4.9922	0.0050
Manlifts	4	7	50	85%	21%	3.66	5.021	1.273	692	#NAME?	0.740	0.450	#NAME?	0.0150	0.0089	#NAME?	2,705	56.5835	0.0571
												Annual Tota	#NAME?	0.0280	0.0168	#NAME?	5,280	110	0

Notes:
- Assume 48 hours per week; 4.28 weeks per month 205 hrs/month
- Emission factors for CO, VOC, and CO2 are average NONROAD emission rates for the State of Washington.
- Emission factors for CH4 and N2O are from the Climate Registry 2014 Default Emission Factors, Table 13.7.
- Tugboat, Workboat, and Personnel Boat Emissions factors from U.S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report April 2009, Table 3-8: Harbor Craft Emission Factors (g/kWh)

Road Vehicle Terminal Construction Criteria Pollutant Emissions
PSE LNG

Construction Vehicle Emissions - Winter 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	311.0	0.0	0.0	2.83	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		38	1942.0	0.0	0.0	3.11	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 1. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	325.2	0.0	0.0	1.83	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		1,225	2017.0	0.0	0.0	3.11	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers	Seattle-Tacoma	309,120	306.0	0.0	0.0	2.68	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		9,999	1942.0	0.0	0.0	2.86	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 2. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	309,120	319.3	0.0	0.0	1.70	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		5,789	2018.0	0.0	0.0	2.86	0.5	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	302,400	300.0	0.0	0.0	2.56	0.0	#NAME?	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		6,356	1942.0	0.0	0.0	2.62	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.001	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 3. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2C (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	614,880	313.8	0.0	0.0	1.59	0.0	#NAME?	#NAME?	0.002	0.001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		4,160	2018.0	0.0	0.0	2.62	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.002	0.001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Construction Vehicle Emissions - Winter 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	295.0	0.0	0.0	2.46	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		457	1942.0	0.0	0.0	2.38	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Construction Vehicle Emissions - Summer 4. Year

Vehicle Class	Area From Which Workers Commute	VMT	CO_2 (g/VMT)	CH_4 (g/VMT)	N_2O (g/VMT)	CO (g/VMT)	VOCs (g/VMT)	CO_2c (g/VMT)	CO_2 (tonne/ year)	CH_4 (tonne/ year)	N_2O (tonne/ year)	CO_2e (tonne/ year)	Fuel consumption (mmBtu/ year)	Upstream CO_2 (tonne/ year)	Upstream CH_4 (tonne/ year)	Upstream N_2O (tonne/ year)	Upstream CO_2e (tonne/ year)	Total CO_2e (tonne/ year)
Construction Workers Car	Seattle-Tacoma	0	308.5	0.0	0.0	1.51	0.0	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Heavy Duty Delivery Trucks		306	2019.0	0.0	0.0	2.38	0.4	#NAME?	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Total	#NAME?	0.000	0.000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
								Annual Total	**#NAME?**	**0.0**	**0.0**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**

Notes:
EFs from EPA MOVES model.
Construction Worker vehicles assumed to be ID 21 - Passenger Car. Heavy-Duty Delivery trucks assumed to be 61 - Combination Short-haul truck.
Assume 48 hours per week; 4.28 weeks per month

Month/Year	Season	# of work days/ month	# of Cars/day	# of cars/ month	Car VMT/ month	# of Trucks/ month	Truck VMT/ month	Total On-Site VMT/ month (Car and Truck)
Jan-1. Year		26.6	0	0	0	0.00	0	0
Feb-1. Year	Winter 1. Year	24	0	0	0	0.00	0	0
Mar-1. Year		26.6	0	0	0	0.00	0	0
Apr-1. Year		25.7	0	0	0	0.00	0	0
May-1. Year		26.6	0	0	0	0.00	0	0
Jun-1. Year	Summer 1. Year	25.7	0	0	0	85.00	331	331
Jul-1. Year		26.6	0	0	0	85.00	320	320
Aug-1. Year		26.6	0	0	0	75.00	282	282
Sep-1. Year		25.7	0	0	0	75.00	292	292
Oct-1. Year		26.6	0	0	0	5.00	19	19
Nov-1. Year	Winter 1. Year	25.7	0	0	0	5.00	19	19
Dec-1. Year		26.6	0	0	0	0.00	0	0
Jan-2. Year		26.6	0	0	0	0.00	0	0
Feb-2. Year	Winter 2. Year	24.9	0	0	0	0.00	0	0
Mar-2. Year		26.6	0	0	0	0.00	0	0
Apr-2. Year		25.7	0	0	0	0.00	0	0
May-2. Year		26.6	0	0	0	0.00	0	0
Jun-2. Year	Summer 2. Year	25.7	0	0	0	174.00	677	677
Jul-2. Year		26.6	98	2,604	104,160	244.00	918	105,078
Aug-2. Year		26.6	98	2,604	104,160	294.00	1,106	105,266
Sep-2. Year		25.7	98	2,520	100,800	794.00	3,088	103,888
Oct-2. Year		26.6	98	2,604	104,160	844.00	3,176	107,336
Nov-2. Year	Winter 2. Year	25.7	98	2,520	100,800	894.00	3,477	104,277
Dec-2. Year		26.6	98	2,604	104,160	889.00	3,346	107,506
Jan-3. Year		26.6	98	2,604	104,160	888.00	3,342	107,502
Feb-3. Year	Winter 3. Year	24	98	2,352	94,080	329.00	1,371	95,451
Mar-3. Year		26.6	98	2,604	104,160	279.00	1,050	105,210
Apr-3. Year		25.7	98	2,520	100,800	279.00	1,085	101,885
May-3. Year		26.6	98	2,604	104,160	252.00	948	105,108
Jun-3. Year	Summer 3. Year	25.7	98	2,520	100,800	189.00	735	101,535
Jul-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Aug-3. Year		26.6	98	2,604	104,160	139.00	523	104,683
Sep-3. Year		25.7	98	2,520	100,800	89.00	346	101,146
Oct-3. Year		26.6	0	0	0	78.00	294	294
Nov-3. Year	Winter 3. Year	25.7	0	0	0	39.00	152	152
Dec-3. Year		26.6	0	0	0	39.00	147	147
Jan-4. Year		26.6	0	0	0	39.00	147	147
Feb-4. Year	Winter 4. Year	24	0	0	0	39.00	163	163
Mar-4. Year		26.6	0	0	0	39.00	147	147
Apr-4. Year		25.7	0	0	0	41.00	159	159
May-4. Year		26.6	0	0	0	39.00	147	147
Jun-4. Year	Summer 4. Year	25.7	0	0	0	0.00	0	0
Jul-4. Year		26.6	0	0	0	0.00	0	0
Aug-4. Year		26.6	0	0	0	0.00	0	0
Sep-4. Year		25.7	0	0	0	0.00	0	0
Oct-4. Year		26.6	0	0	0	0.00	0	0
Nov-4. Year	Winter 4. Year	25.7	0	0	0	0.00	0	0
Dec-4. Year		26.6	0	0	0	0.00	0	0
Total					1,535,520		28,330	

Note: Commute round-trip distance was assumed

Cars VMT round trip	40	mi/day
Truck VMT round trip	100	mi/day

Summary VMTs		Car VMT/ month	Truck VMT/ month
1.Year	Winter	0	38.00
	Summer	0	1225.00
2.Year	Winter	309,120	9999.00
	Summer	309,120	5789.00
3.Year	Winter	302,400	6356.00
	Summer	614,880	4160.00
4.Year	Winter	0	457.00
	Summer	0	306.00
Total		**1,535,520**	**28330.00**

sion Diesel production		Total
Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00009	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00007	#NAME?	#NAME?
0.00013	#NAME?	#NAME?
0.0	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00011	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00005	#NAME?	#NAME?
0.00058	#NAME?	#NAME?
0.0015	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00002	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00014	#NAME?	#NAME?
0.00007	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00010	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00067	#NAME?	#NAME?
0	#NAME?	#NAME?

Upstream N2O (tonne/ year)	Upstream CO2e (tonne/ year)	Total CO2e (tonne/ year)
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00002	#NAME?	#NAME?
0.00008	#NAME?	#NAME?
0.00004	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00006	#NAME?	#NAME?
0.00000	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00001	#NAME?	#NAME?
0.00003	#NAME?	#NAME?
0.00039	#NAME?	#NAME?
0	#NAME?	#NAME?

Construction Material & Power- UPSTREAM Emissions -

Input	tonnes	Source
Steel	4,745	Response Tacoma LNG Supplementary SEIS Questions, July 07, 2018, page 5
Rebar	1666.0	
Stainless Steel	290.0	
Copper	26	
Asphalt	7570.0	
Paint	5.0	
Aggregate	80110.0	
Cement	1716.0	

Pollutant	CO_2	CH_4	N_2O	CO_2e	Source
Life Cycle Emission Factor (g/kg)					
Structural Steel	2,687	4.3	0.0	#NAME?	GREET2_2017
Rebar	2,020	3.5	0.0	#NAME?	GREET2_2017
Stainless Steel	5,204	11.3	0.1	#NAME?	GREET2_2017
Copper	3,083	6.31	0.1	#NAME?	GREET2_2017
Asphalt	639	0.42	0.0	#NAME?	GREET1_2017
Aggregate	300	0.20	0.0	#NAME?	GREET1_2017
Cement	2,900	0.70	0.0	#NAME?	GREET1_2017
Emissions (tonne)					
Structural Steel	12,748	20.6	0.10	#NAME?	
Rebar	3,366	5.9	0.04	#NAME?	
Stainless Steel	1,509	3.3	0.03	#NAME?	
Copper	80.2	0.2	0.00	#NAME?	
Asphalt	4,841	3.2	0.02	#NAME?	
Aggregate	24,033	16.0	0.00	#NAME?	
Cement	4,976	1.2	0.00	#NAME?	
Total	**51,553**	**50.3**	**0.19**	**#NAME?**	

Total power consumption during construction

Consumption	10,512,000	kWh

Source: Response Tacoma LNG Supplementary SEIS Questions, july 07, 2018, page 5

Upstream Emissions Power (see sheet Upstream, B40)

Gig Harbor Peak Shaving

General inputs		
Total LNG delivery to Gig Harbor per year	#NAME?	gal
Truck capacity	10,000	gal
Number of trips	#NAME?	

Calculation of Annual Diesel Truck Consumption	LNG Project	No project	
Distance to gig harbor	17	175	miles/trip
Annual miles for delivery	#NAME?	#NAME?	miles/year
Diesel consumption per mile	**17,738**	**17,738**	**Btu/mile**
Total Diesel Consumption	**#NAME?**	**#NAME?**	**mmBtu/year**

	Diesel Consumption	**Emissions (t/year)**			
Processing Step	**mmBtu/year**	**CO_2**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
No project	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

On-road trucking

Annual Fuel delivery to tractors		Consumption	
	Equipment	Mgal/year	GBtu/year
LNG	Tractor engine	#NAME?	#NAME?
Diesel	Tractor engine	#NAME?	#NAME?

				Emissions (g/MMBTU)				Old value from BID
Pathway Component	**VOC**	**CO**	**NO_x**	**CH_4**	**N_2O**	**CO_2**	**CO_{2C}**	**CO_{2C}**
Plant-to-Tank LNG Combination								
Tank-to-Wheels LNG Combination Tractor	21.07	1,167	66.09	309.766737	0.03250653	#NAME?	#NAME?	#NAME?
Total LNG Tacoma -to-Wheels	**21.07**	**1,167**	**66.09**	**309.8**	**0.03**	**#NAME?**	**#NAME?**	**#NAME?**
Well-to-Wheels Diesel Combination Tractor	**31.52**	**94.58**	**228.4**	**4.75**	**0.18**	#NAME?	**#NAME?**	**#NAME?**
Plant-to-Tank LNG Combination Tractor	0.308	1.289	7.299	104.5	0.017	753	#NAME?	#NAME?

	Consumption	**Emissions (t/year)**			
Processing Step	**mmbtu/year**	**CO_2c**	**CH_4**	**N_2O**	**CO_{2e}**
LNG Project - LNG Tractor	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Diesel tractor	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Ship Emissions and Fuel Consumption Estimates

Route Definition

Source: 2018-05-25 PSE Submittal page 79, tables TOTE Vessel Emissions

									Time within 200 nm		
Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	Transit	Maneuvering	Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Use of extra pilot fuel for LNG Marine vessel	3%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
					Low Pressure DF LNG All	Low Pressure DF LNG All	
24	25.5	52200	400	720			LNG Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	LNG	LNG
Maneuvering	2.0	1,044	396	148	LNG	LNG
Hotelling	20.0	0	229	259	LNG	LNG

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	0.58	0.00	0.58	0.00	0.01	0.01	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	0.60	0.00	0.60	0.00	0.01	0.01	0.00
Emissions Rate (g/tonne MGOe)	9,376	6	9,456	17	106	105	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	135	0.01	1.62	#NAME?	#NAME?
	1	0.00	0.01	#NAME?	#NAME?
	3	0.00	0.01	#NAME?	#NAME?
Total Emissions (tonne)	139	0.01	1.64	#NAME?	#NAME?
Emissions Rate (g/tonne MGOe)	2,172,237	153	25,601	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	3.62	0.00	3.62	0.01	0.04	0.04	0.00
	0.01	0.00	0.02	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (tonne)	3.64	0.00	3.64	0.01	0.04	0.04	0.00
Emissions Rate (g/tonne MGOe)	9,310	3	9,323	17	99	99	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e
	846	0.06	10.10	#NAME?	#NAME?
	1	0.00	0.01	#NAME?	#NAME?
	3	0.00	0.01	#NAME?	#NAME?
Total Emissions (tonne)	849	0.06	10.12	#NAME?	#NAME?
Emissions Rate (g/tonne MGOe)	2,172,639	152	25,881	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NO_x	VOC	CO	SO_2	PM10	PM2.5	DPM
	4.20	0.00	4.20	0.01	0.04	0.04	0.00
	0.02	0.00	0.04	0.00	0.00	0.00	0.00
	0.02	0.00	0.01	0.00	0.00	0.00	0.00
Total Emissions (tonne)	4.24	0.00	4.25	0.01	0.05	0.05	0.00
Emissions Rate (g/tonne MGOe)	9,320	3	9,342	17	100	100	0
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO_2	N_2O	CH_4	CO_2c	CO_2e	BC	OC	Methane Slip
	981	0.07	11.71	#NAME?	#NAME?	0.01	0.00	#NAME?
	1	0.00	0.02	#NAME?	#NAME?	0.00	0.00	#NAME?
	5	0.00	0.02	#NAME?	#NAME?	0.00	0.00	#NAME?
Total Emissions (tonne)	988	0.07	11.75	#NAME?	#NAME?	0.01	0.02	
Emissions Rate (g/tonne MGOe)	2,172,582	152	25,841	#NAME?	#NAME?	22	46	
Emissions Rate (g/mmBtu MGOe, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Boiler
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8
Fuel Consumed (MT MGOe)	450.1	3.0	1.6

Within 200nm								Emissions Factors (g/kWh)		
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Outside 200nm								Emissions Factors (g/kWh)		
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Hotelling	8.80	0.01	18.39	0.00	0.15	0.15	0.00	444	0.03	5.30
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Maneuvering	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Hotelling	1.90	0.00	1.90	0.00	0.02	0.02	0.00	444	0.03	5.30
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Maneuvering	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00
Hotelling	2.00	0.10	0.20	0.00	0.16	0.15	0.00	644	0.08	0.00

Ship Emissions and Fuel Consumption Estimates

Route Definition

Ship Type	Origin	Destination	Distance at Sea (nm)	Transit Speed (knots)	Transit Time (hours)	Maneuvering Time (hours)	Time at Berth (Origin - hours)	Time at Berth (Destination - hours)	*Time within 200 nm* Transit	Maneuvering	Hotelling
RoRo	Anchorage	Tacoma	1450	22	65.9	2	10	10	14%	50%	50%

Vessel Details

Service Speed (knots)	Max Speed (knots)	Installed Power (kW)	Main Engine Speed (RPM)	Aux Engine Speed (RPM)	Main Engine Type	Aux Engine Type	Boiler Type
24	25.5	52200	400	720	Medium speed diesel 2000 - 2010	Medium speed diesel 2000 - 2010	Fuel Oil Aux Boiler All

Outputs

Calculated Loads

Mode	Time (hours)	Main Engine Load (kW)	Aux Engine Load (kW)	Aux Boiler Load (kW)	Fuel - In ECA	Fuel - Outside ECA
Transit	65.9	33,396	132	0	MGO ((	MGO (0.1% S)
Maneuvering	2.0	1,044	396	148	MGO ((	MGO (0.1% S)
Hotelling	20.0	0	229	259	MGO ((	MGO (0.1% S)

Emissions Calcs

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	3.72	0.15	0.34	0.13	0.07	0.07	0.07
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	3.82	0.16	0.35	0.15	0.08	0.07	0.08
Emissions Rate (g/tonne MGO)	59,739	2,578	5,478	2,287	1,191	1,141	1,184
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Within 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	198	0.01	0.00	#NAME?	#NAME?
	1	0.00	0.00	#NAME?	#NAME?
	4	0.00	0.00	#NAME?	#NAME?
Total Emissions (tonne)	203	0.01	0.00	#NAME?	#NAME?
Emissions Rate (g/tonne MGO)	3,171,667	153	48	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	23.24	0.95	2.10	0.80	0.46	0.44	0.46
	0.06	0.01	0.01	0.00	0.00	0.00	0.00
	0.03	0.00	0.00	0.02	0.00	0.00	0.00
Total Emissions (tonne)	23.34	0.96	2.11	0.82	0.46	0.44	0.46
Emissions Rate (g/tonne MGO)	59,707	2,467	5,398	2,093	1,177	1,128	1,176
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Outside 200nm (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e
	1,235	0.06	0.02	#NAME?	#NAME?
	1	0.00	0.00	#NAME?	#NAME?
	4	0.00	0.00	#NAME?	#NAME?
Total Emissions (tonne)	1,240	0.06	0.02	#NAME?	#NAME?
Emissions Rate (g/tonne MGO)	3,171,667	152	49	#NAME?	#NAME?
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
	26.96	1.10	2.43	0.93	0.53	0.51	0.53
	0.13	0.02	0.02	0.00	0.00	0.00	0.00
	0.07	0.00	0.01	0.03	0.00	0.0018	0.00
Total Emissions (tonne)	27.15	1.13	2.46	0.96	0.54	0.51	0.54
Emissions Rate (g/tonne MGO)	59,711	2,482	5,410	2,121	1,179	1,130	1,177
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Total Emissions (tonne per trip)

End Use Emissions Marine vessels	CO2	N2O	CH4	CO2c	CO2e	BC	OC
	1,432	0.07	0.02	#NAME?	#NAME?	0.10	0.23
	2	0.00	0.00	#NAME?	#NAME?	0.00	0.00
	8	0.00	0.00	#NAME?	#NAME?	0.00	0.00
Total Emissions (tonne)	1,442	0.07	0.02	#NAME?	#NAME?	0.10	0.20
Emissions Rate (g/tonne MGO)	3,171,667	152	49	#NAME?	#NAME?	226	433
Emissions Rate (g/mmBtu MGO, LHV)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Fuel Consumption Estimates

Geographic Region	Engine	Engine	Aux Boiler	
Fuel Consumed Within 200nm (MT MGOe)	62.2	0.8	0.8	
Fuel Consumed Outside 200nm (MT MGOe)	387.9	2.2	0.8	Looks like LNG
Fuel Consumed (MT MGOe)	450.1	3.0	1.6	

Within 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

Outside 200nm						Emissions Factors (g/kWh)				
Main Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.50	1.10	0.42	0.24	0.23	0.24	648	0.03	0.01
Maneuvering	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Hotelling	56.49	10.59	10.65	0.42	1.75	1.68	1.75	648	0.03	0.01
Aux Engine	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Maneuvering	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Hotelling	12.20	0.40	1.10	0.44	0.24	0.23	0.24	683	0.03	0.01
Aux Boiler	**NO_x**	**VOC**	**CO**	**SO_2**	**PM10**	**PM2.5**	**DPM**	**CO_2**	**N_2O**	**CH_4**
Transit	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Maneuvering	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00
Hotelling	2.00	0.10	0.20	6.00	0.16	0.15	0.00	922	0.08	0.00

EQUIPMENT INFORMATION

Component	Phase	Fluid Serviced									Emission Factors[3] (lb/hr per component)	LDAR Control Efficiency[4]
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas		
Valves	Gas/Vapor	39	9	12	36	33	244	112	185	30	0.001370	75%
	Light Liquid										0.005370	75%
	Heavy Liquid										0.000502	0%
Pump Seals	Light Liquid					1					0.049300	75%
	Heavy Liquid										0.009820	0%
Flanges/Connectors	Gas/Vapor	0	7	2	15	6	114	28	77	15	0.000559	30%
	Light Liquid										0.000559	30%
	Heavy Liquid										0.000559	30%
Compressor Seals	Gas/Vapor	0	2	0	0	0	0	1	1	0	0.016550	75%
Relief Valves	Gas/Vapor	3	0	1	3	1	19	8	9	2	0.022030	75%
Swivel Joints	Light Liquid						4				0.049300	75%

FLUID HAP/TAP CONTENT

Pollutant	CAS / ID	Fluid								
		Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas
Methane Content (%wt)[1]	74-82-8	100%	100%	100%	100%	100%	100%	100%	100%	100%
n-Hexane (ppmw)[1]	110-54-3	70	5.7E-10	0	1,185	210,669	27	0	1,185	1,185
Hydrogen sulfide (ppmw)[1]	2148878	3,128	0.00035	0	22	0.010	0.21	0	22	166
Benzene (ppmw)[b, 2]	71-43-2	4.0	4.0	0	4.0	4.0	4.0	0	4.0	4.0
Ethylbenzene (ppmw)[b, 2]	100-41-4	0.20	0.20	0	0.20	0.20	0.20	0	0.20	0.20
m,p-Xylene (ppmw)[b, 2]	106-42-3	1.3	1.3	0	1.3	1.3	1.3	0	1.3	1.3
o-Xylene (ppmw)[b, 2]	95-47-6	0.22	0.22	0	0.22	0.22	0.22	0	0.22	0.22
Toluene (ppmw)[b, 2]	108-88-3	3.5	3.5	0	3.5	3.5	3.5	0	3.5	3.5

POTENTIAL EMISSIONS

Pollutant	CAS / ID	Amine Gas	Boil-Off Gas	Ethylene	Fuel Gas	Hydrocarbon Liquid	Liquefied Natural Gas	Mixed Refrigerant	Natural Gas	Untreated Natural Gas	Total
					Hourly Emissions[a] (lb/hr)						
Methane[c]	74-82-8	0.02988000	0.01409660	0.01040010	0.03472200	0.06448280	0.52612070	0.09751390	0.14719760	0.02715950	0.95157320
n-Hexane	110-54-3	0.00000208	0.00000000	0.00000000	0.00004113	0.01358456	0.00001441	0.00000000	0.00017437	0.00003217	0.01384873
Hydrogen sulfide	2148878	0.00009345	0.00000000	0.00000000	0.00000075	0.00000000	0.00000011	0.00000000	0.00000319	0.00000451	0.00010202
Benzene	71-43-2	0.00000012	0.00000006	0.00000000	0.00000014	0.00000026	0.00000212	0.00000000	0.00000059	0.00000011	0.00000341
Ethylbenzene	100-41-4	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000010	0.00000000	0.00000003	0.00000001	0.00000016
m,p-Xylene	106-42-3	0.00000004	0.00000002	0.00000000	0.00000005	0.00000009	0.00000070	0.00000000	0.00000020	0.00000004	0.00000113
o-Xylene	95-47-6	0.00000001	0.00000000	0.00000000	0.00000001	0.00000001	0.00000012	0.00000000	0.00000003	0.00000001	0.00000019
Toluene	108-88-3	0.00000010	0.00000005	0.00000000	0.00000012	0.00000022	0.00000183	0.00000000	0.00000051	0.00000009	0.00000294
Total HAPs	HAP	0.00000028	0.00000013	0.00000000	0.00000032	0.00000060	0.00000488	0.00000000	0.00000136	0.00000025	0.00000782
					Daily Emissions[a] (kg / day)						
Methane[c]	74-82-8	0.32528018	0.15345866	0.11321775	0.37799125	0.70197379	5.72746442	1.06155753	1.60242510	0.29566423	10.35903292
n-Hexane	110-54-3	0.00002263	0.00000000	0.00000000	0.00044777	0.14788443	0.00015692	0.00000000	0.00189824	0.00035025	0.15076024
Hydrogen sulfide	2148878	0.00101733	0.00000000	0.00000000	0.00000819	0.00000001	0.00000121	0.00000000	0.00003474	0.00004914	0.00111062
Benzene	71-43-2	0.00000131	0.00000062	0.00000000	0.00000153	0.00000283	0.00002312	0.00000000	0.00000647	0.00000119	0.00003707
Ethylbenzene	100-41-4	0.00000006	0.00000003	0.00000000	0.00000007	0.00000014	0.00000112	0.00000000	0.00000031	0.00000006	0.00000179
m,p-Xylene	106-42-3	0.00000043	0.00000020	0.00000000	0.00000050	0.00000094	0.00000765	0.00000000	0.00000214	0.00000039	0.00001227
o-Xylene	95-47-6	0.00000007	0.00000003	0.00000000	0.00000008	0.00000016	0.00000128	0.00000000	0.00000036	0.00000007	0.00000205
Toluene	108-88-3	0.00000113	0.00000053	0.00000000	0.00000132	0.00000244	0.00001994	0.00000000	0.00000558	0.00000103	0.00003197
Total HAPs	HAP	0.00000302	0.00000142	0.00000000	0.00000350	0.00000651	0.00005311	0.00000000	0.00001486	0.00000274	0.00008516
					Annual Emissions[a] (short ton per year)						
Methane[c]	74-82-8	0.13087440	0.06174311	0.04555244	0.15208236	0.28243466	2.30440867	0.42711088	0.64472549	0.11895861	4.16789062
n-Hexane	110-54-3	0.00000910	0.00000000	0.00000000	0.00018016	0.05950036	0.00006314	0.00000000	0.00076375	0.00014092	0.06065742
Hydrogen sulfide	2148878	0.00040932	0.00000000	0.00000000	0.00000330	0.00000000	0.00000049	0.00000000	0.00001398	0.00001977	0.00044685
Benzene	71-43-2	0.00000053	0.00000025	0.00000000	0.00000061	0.00000114	0.00000930	0.00000000	0.00000260	0.00000048	0.00001492
Ethylbenzene	100-41-4	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000045	0.00000000	0.00000013	0.00000002	0.00000072
m,p-Xylene	106-42-3	0.00000017	0.00000008	0.00000000	0.00000020	0.00000038	0.00000308	0.00000000	0.00000086	0.00000016	0.00000494
o-Xylene	95-47-6	0.00000003	0.00000001	0.00000000	0.00000003	0.00000006	0.00000052	0.00000000	0.00000014	0.00000003	0.00000083
Toluene	108-88-3	0.00000046	0.00000021	0.00000000	0.00000053	0.00000098	0.00000802	0.00000000	0.00000224	0.00000041	0.00001286
Total HAPs	HAP	0.00000121	0.00000057	0.00000000	0.00000141	0.00000262	0.00002137	0.00000000	0.00000598	0.00000110	0.00003426

If Capacity is 500.0
a factor of 2 is app
metric tonne&yea
#NAME?

Calculations:

[a] Hourly Emissions (lb/hr) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)]
Annual Emissions (tpy) = [Emission Factor (lb/hr per component)] x [Component Count] x [Pollutant Content (%wt)] x [1 - LDAR Control Efficiency (%)] x [Hours of Operation (hrs/yr)] / [2,000 lb/ton]

Hours of Operation (hrs/yr) =	8,760	

[b] Pollutant Concentration (ppmw) = [Pollutant Concentration ($\mu g/m^3$)] / [453.6 g/lb] / [10^6 $\mu g/g$] / [35.31 ft^3/m^3] / [Gas Density (lb/cf)] x 10^6

Benzene Concentration ($\mu g/m^3$) =	2,980	[5]
Ethylbenzene Concentration ($\mu g/m^3$) =	144	[5]
m,p-Xylene Concentration ($\mu g/m^3$) =	986	[5]
o-Xylene Concentration ($\mu g/m^3$) =	165	[5]
Toluene Concentration ($\mu g/m^3$) =	2,570	[5]
Natural Gas Density (lb/scf) =	0.046	[5]

Notes:

[1] Provided by CB&I.

[2] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most HAPs will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we assume each fluid has the full concentration of HAP to provide a conservative emissions estimate.

[3] Terminal/Depot factors from South Coast Air Quality Management District's "Guidelines for Fugitive Emissions Calculations" (June 2003). In this guidance, the District updated emissions factors that were identified in the EPA's "Protocol for Equipment Leak Emission Estimates (November 1995).

[4] Control effectiveness from Texas Commission for Environmental Quality (TCEQ) "Control Efficiencies for TCEQ Leak Detection and Repair Programs" (July 2011) for its 28M fugitive leak detection program.

[5] See fuel characteristics in Table B-2.

[6] Assume all VOC is CH_4.

Life Cycle Associates, LLC

Fuel Life Cycle Factors Sheet

#NAME?

Lookup Key	AR5_100	AR5_20	AR4_100	AR4_20
AR Edition	AR5	AR5	AR4	AR4
Time Horizon	100	20	100	20
CO_2	1	1	1	1
CH_4	30	85	25	72
N_2O	265	264	298	289
BC	900	3200	900	3200
OC	-69	-240	-69	-240

Global Warming Potential, Molecular Weight

Species	GWP	Mol Wt	Variable Name GWP	MW
CO2	1.000	#NAME?	CO2_GWP	CO2_MW
CH4	25.000	#NAME?	CH4_GWP	CH4_MW
N2O	298.000	#NAME?	N2O_GWP	N2O_MW
VOC	3.117	10.209	VOC_GWP	VOC_MW
CO	1.571	#NAME?	CO_GWP	CO_MW
NO2	0.000	#NAME?	NO2_GWP	NO2_MW
BC	900.000			
OC	-69.000			
C		12.011		C_MW
H		1.008		H_MW
O		15.994		O_MW
N		14.007		N_MW
Ca		40.078		Ca_MW
Cl		35.453		Cl_MW
Na		22.990		Na_MW
S		32.065		S_MW
P		30.974		P_MW
K		39.098		K_MW

Carbon and Sulfur Ratios of Pollutants

	Ratio	Variable Name	CO_2/pollutant
Carbon ratio of VOC	0.85	VOC_C_Ratio	#NAME?
Carbon ratio of CO	#NAME?	CO_C_Ratio	#NAME?
Carbon ratio of CH4	#NAME?	CH4_C_Ratio	#NAME?
Carbon ratio of CO2	#NAME?	CO2_C_Ratio	1.00
Sulfur ratio of SO2	0.50	SO2_S_Ratio	

Conversion Factors

		Variable Name	
Energy			
J/Btu	1055.056	JperBtu	
Btu/MJ	#NAME?	BtuperMJ	
Btu/kWh	#NAME?	BtuperkWh	
Mass			
g/lb	453.597	gperlb	
metric tonne/ton	#NAME?	tonneperton	#NAME?
ton/metric tonne	1.102	shorttonpertonne	
lb/kg	#NAME?	lbperkg	
Volume			
scf/m3	35.3000	scfperm3	
L/gal	3.785	Lpergal	
Area			
acre/hectare	2.471	acreperhectare	
Distance			
cm/inch	2.54	cmperinch	
mi/naut mi	1.151	mipernaut	
ft/mi	5280		
km/mi	1.609	kmpermi	
scf/lb mol	379	scfperlbmol	
NL/g mol	22.414	Lpergmol	
Capacity			
kW/hr	1.341	kwperhp	

Emission Factors

Washington

Fuel/ Application	Equipment Type	CO_2c	CH_4	N_2O	CO_2e
GREET WTT Emissions (g/mmBtu), LHV					

Diesel	Diesel Engine	#NAME?	4.2	0.6	#NAME?
Diesel	HD Truck	#NAME?	4.7	0.2	#NAME?
Diesel	Industrial Boiler	#NAME?	0.2	0.9	#NAME?
Gasoline, E10	Gasoline Engine	#NAME?	3.0	0.6	#NAME?
Bunker Fuel	**TOTE Marine Engine**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
Bunker Fuel	**Residual Oil**	**#NAME?**	**4.2**		
Natural Gas	IC Engine	#NAME?	392	0.1	#NAME?
Natural Gas	Turbine, CC	#NAME?	1.1	0.1	#NAME?
Natural Gas	Small Boiler	#NAME?	1.1	0.4	#NAME?
Natural Gas	Large Boiler	#NAME?	1.1	0.8	#NAME?
LNG	**TOTE Marine Engine**	**#NAME?**	**#NAME?**	**#NAME?**	**#NAME?**
LNG	**IC Engine, GREET**	#NAME?	92		
LNG	**Marine Engine, This Stud**	#NAME?			
LNG	Truck	#NAME?	309.8	0.0	#NAME?
LNG	NG Peak Shaving	#NAME?	1.1	0.4	#NAME?
LPG from Tacoma LNG	Boiler	#NAME?	1.1	1.1	#NAME?
LPG, conventional	Boiler	#NAME?	1.1	1.1	#NAME?
Waste Flare LPG - Tacoma LNG plant	Flare	#NAME?	1.1	1.1	#NAME?
Waste Flare gas - LNG plant	Flare	68,662	1.1	1.1	59,660
Fuel Gas	Boiler	#NAME?	1.1	0.8	#NAME?
Coal	Boiler	#NAME?	1.1	1.6	#NAME?

Specifications of Fuels, Global Warming Potentials of Greenhouse Gases, and Carbon and Sulfur Ratios of Pollutants

1) Specifications of Fuels

Fuel	Calculation:	Heating Value			Density	C ratio	S ratio	S ratio	SO_x	10	11	12	13	14	15	16		18	19	20	21	
		LHV	LHV	HHV	Density	(% by wt)	(ppm by wt)			Total C in Fuel LHV	Carbon Factor Fossil C in Fuel LHV	Biogenic C in Fuel LHV		Heating Value LHV	Heating Value HHV	Heating Value LHV	Heating Value HHV		LHV/HHV ratio	Other Properties Density		Source
Use LHV or HHV in calculations?	1	1 -- LHV; 2 -- HHV																				
Liquid Fuels:		Btu/gal	Btu/gal	Btu/gal	g/gal			Ratio by Wt.	g/mmBtu	g CO2/mmBtu	g CO2/mmBtu	g CO2/mmBtu	g CO_2/MJ	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/unit		lb/gal	kg/L	
Crude oil		129,670	136,392	5,206	85.3%	16,000		0.016000	395	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Conventional gasoline		116,090	124,340	2,819	86.3%	26		0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	GREET1_2012
Reformulated or low-sulfur gasoline		113,602	121,848	2,830	86.3%	26		0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	Calculation
CARBOB for CARFG		113,300	124,340	2,767	85.9%	15			0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
CA reformulated gasoline		109,772	120,541	2,788	82.9%	11		0.000011	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
U.S. conventional diesel		128,450	137,380	3,167	86.5%	200		0.000200	5	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Diesel for non-road engines		128,450	137,380	3,167	86.5%	163		0.000163	4	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Low-sulfur diesel		127,464	127,464	**133,075**	**3,142**	**86.5%**	11	0.000011	0.271	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Petroleum naphtha		116,920	116,920	125,080	2,745	85.0%	1	0.000001	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
GTL naphtha		111,520	111,520	119,740	2,651	84.2%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Residual oil		140,353	140,353	150,110	3,752	86.8%	5,000	0.005000	134	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Bunker fuel for ocean tanker		140,353	140,353	150,110	3,752	86.8%	28,000	0.028000	749	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Methanol		57,250	57,250	65,200	3,006	37.5%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Ethanol		76,330	76,330	84,530	2,986	52.2%	1	0.000001	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Butanol		99,837	99,837	108,458	3,065	64.9%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Acetone		83,127	83,127	89,511	2,964	62.0%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
E-Diesel Additives		116,090	116,090	124,340	2,819	86.3%	26	0.000026	1	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
LPG		#NAME?	#NAME?	#NAME?	1,923	81.8%		0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Liquefied natural gas (LNG)		#NAME?	#NAME?	#NAME?	1,646	75.1%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Dimethyl ether		68,930	68,930	75,610	2,518	52.2%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Dimethoxy methane (DMM)		72,200	72,200	79,197	3,255	47.4%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Algae Oil, TAG		124,316	124,316	138,129	3,444		0	0.000000	0		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Vegetable Oil (PVO)					3,400								#NAME?	37.5	#NAME?		#NAME?			#NAME?	#NAME?	Look something u
Methyl ester (biodiesel, BD)		119,550	119,550	127,960	3,361	77.6%	0	0.000000	0	#NAME?	3,873	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?	#NAME?	CA_GREET
Ethyl ester (biodiesel, BD)		119,550	119,550	127,960	3,500	77.6%	0			#NAME?	-		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?	#NAME?	CA_GREET
GTL Diesel		122,800	122,800	132,100	2,953	84.8%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Diesel I (SuperCetane)		117,059	117,059	125,294	2,835	87.1%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Diesel II (UOP-HDO)		122,887	122,887	130,817	2,948	87.1%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Renewable Gasoline		115,983	115,983	124,230	2,830	84.0%	0	0.000000	0	#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Liquid hydrogen		30,500	30,500	36,020	268	0.0%	0	0.000000	0		-	-	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Methyl tertiary butyl ether (MTBE)		93,540	93,540	101,130	2,811	68.1%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Ethyl tertiary butyl ether (ETBE)		96,720	96,720	104,530	2,810	70.6%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Tertiary amyl methyl ether (TAME)		100,480	100,480	108,570	2,913	70.6%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Butane		94,970	94,970	103,220	2,213	82.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Isobutane		90,060	90,060	96,560	2,115	82.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Isobutylene		95,720	95,720	103,010	2,253	85.7%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Propane		84,250	84,250	91,420	1,920	81.8%	0	0.000000	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	CA_GREET
Natural gas liquids		83,686	83,686	90,052			0	0.000000	0				#NAME?							#NAME?	#NAME?	CA_GREET
Still gas (in refineries)		128,590	128,590	142,860			0	0.000000			#NAME?		#NAME?							#NAME?	#NAME?	CA_GREET
Gaseous Fuels (at 32F and 1atm):		Btu/ft3	Btu/ft3	Btu/ft3	g/ft3			Ratio by Wt.	g/mmBtu	g CO2/mmBtu	g CO2/mmBtu		g CO_2/MJ	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/unit		lb/ft^		CA_GREET
Natural gas		984	984	1,090	21.18	75.0%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Hydrogen		282	282	331	2.48	0.0%	0	0.000000	0	#NAME?			#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Carbon Dioxide					56.98	27.3%	0	0.000000												#NAME?		CA_GREET
Still gas (in refineries)		1,458	1,458	1,584	32.8	37.9%				#NAME?			#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?		CA_GREET
Landfill Gas		446	446	496	34.54	20.5%				#NAME?			#NAME?	#NAME?	#NAME?	#NAME?	#NAME?			#NAME?		CA_GREET
Fuel Gas (RD I)																						CA_GREET
Shale Gas		930	930	1,030	20.40	72.4%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Flared Gas		930	930	1,030	20.40	72.4%	13.74	0.000014	0	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?		CA_GREET
Propane Fuel Mix (RD II)																						CA_GREET
Solid Fuels:		Btu/ton	Btu/ton	Btu/ton				Ratio by Wt.		g CO2/mmBtu	g CO2/mmBtu		g CO_2/MJ	MJ/kg	MJ/kg	Btu/lb	Btu/lb	MJ/unit				CA_GREET
Coal		19,546,300	19,546,300	20,608,570		63.7%	11,100	0.011100		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	9773.2	10304.3	#NAME?	0.9485			CA_GREET
Bituminous coal		22,460,600	22,460,600	23,445,900		75.5%	11,800	0.011800		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	11230.3	11723.0	#NAME?	0.9580			CA_GREET
Coking coal		24,600,497	24,600,497	25,675,670		74.7%	11,800	0.011800		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	12300.2	12839.8	#NAME?	0.9580			CA_GREET
Lignite																						
Farmed trees		16,811,000	16,811,000	17,703,170		51.7%	0	0.000000		#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	8405.5	8851.6	#NAME?	0.9496			CA_GREET
Herbaceous biomass		14,797,555	14,797,555	15,582,870		42.6%	0	0.000000		#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	7398.8	7791.4	#NAME?	0.9496			CA_GREET
Corn stover		14,075,990	14,075,990	14,974,460		44.5%	0	0.000000		#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	7038.0	7487.2	#NAME?	0.9400			CA_GREET
Forest residue		13,243,490	13,243,490	14,164,160		51.7%	0	0.000000		#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	6621.7	7082.1	#NAME?	0.9350			CA_GREET
Sugarcane straw						50.0%																?
Sugarcane bagasse		12,947,318	12,947,318	14,062,678		46.3%				#NAME?	-	#NAME?	#NAME?	#NAME?	#NAME?	6473.7	7031.3	#NAME?	0.9207			?
Pet Coke		25,370,000	25,370,000	26,920,000		79.9%	68,000	0.068000		#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	12685.0	13460.0	#NAME?	0.9424			?
Stillage solids																						
Lignin																						Jenny has someth
Jet Fuel Properties		Btu/gal	Btu/gal	Btu/gal	g/gal			Ratio by Wt.	g/mmBtu	g CO2/mmBtu	g CO2/mmBtu	g CO2/mmBtu	g CO_2/MJ	MJ/kg	MJ/kg	Btu/lb		MJ/unit		lb/gal	kg/L	
Conventional Petroleum Jet Fuel		#NAME?	#NAME?	#NAME?	#NAME?	86.2%	700	0.000700	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	43.2	43.2	#NAME?		#NAME?		#NAME?	0.802	GREET1_2012
Ultra Low Sulfur Petroleum Jet Fuel (ULSJ)		#NAME?	#NAME?	#NAME?	#NAME?	86.0%	11	0.000011	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	43.3	43.3	#NAME?		#NAME?		#NAME?	0.792	GREET1_2012
GTL Aviation Fuel		#NAME?	#NAME?	#NAME?	#NAME?	84.7%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.1	44.1	#NAME?		#NAME?		#NAME?	0.757	GREET1_2012
GTL Lubricant Base Oil		#NAME?	#NAME?	#NAME?	#NAME?	85.1%	0	0.000000	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	41.2	41.2	#NAME?		#NAME?		#NAME?	0.8	Sasol
GTL Wax		#NAME?	#NAME?	#NAME?	#NAME?	85.0%	1	0.000001	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.0	44.0	#NAME?		#NAME?		#NAME?	0.8	Sasol
Paraffin/Olefin		#NAME?	#NAME?	#NAME?	#NAME?	84.5%	2	0.000002	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	44.5	44.5	#NAME?		#NAME?		#NAME?	0.78	Sasol

Oxy

680

Citation

Wang (2012)

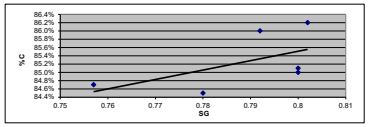
Unnasch (2009)

p.

#NAME?

ling.

86.2%
86.0%
84.7%
85.1%
85.0%
84.5%



1) Emission Factors of Fuel Combustion for Stationary Applications (grams per mmBtu of fuel burned), GREET EF Tab

	Natural Gas							Residual Oil						Diesel Fuel					Gasoline		Crude
	Utility/ Industrial Boiler (>100 mmBtu/hr input)	Small Industrial Boiler (10-100 mmBtu/hr input)	Large Gas Turbine	CC Gas Turbine	Small Turbine	Stationary Reciprocating Engine	NG Flaring in Oil Field	Utility Boiler	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Marine Vessel TOTE	Turbine	Industrial Boiler	Commercial Boiler	Stationary Reciprocating Engine	Turbine	Farming Tractor	Stationary Reciprocating Engine	Farming Tractor	Industrial Boiler
VOC	2.540	2.540	1.056	0.267	1.056	133.316	2.500	2.089	0.905	3.651	2.027	#NAME?	0.258	0.800	1.201	2.027	0.258	63.020	598.350	193.820	0.820
CO	22.210	24.970	41.286	14.533	41.286	705.993	26.000	16.209	36.017	16.153	657.005	#NAME?	1.560	20.867	25.115	657.005	1.560	349.150	1,520.438	6,907.000	23.740
NOx	36.400	41.050	31.969	17.425	31.969	832.952	48.900	433.518	137.081	177.688	2,076.988	#NAME?	256.412	53.860	66.543	2,076.988	256.412	628.010	98.588	267.620	181.600
PM10	3.507	3.507	3.575	0.133	3.575	7.197	3.700	17.379	35.345	35.345	54.608	#NAME?	25.944	8.122	8.404	54.608	25.944	55.970	52.558	7.840	29.712
PM2.5	3.507	3.507	3.575	0.133	3.575	7.197	3.700	13.492	16.173	16.173	54.043	#NAME?	6.574	5.473	7.522	54.043	6.574	54.291	52.558	7.605	19.313
SOx	0.269	0.269	0.269	0.269	0.269	0.269	0.269	739.297	683.325	667.785	267.327	#NAME?	267.327	0.542	0.542	0.542	0.542	0.542	1.238	1.238	395.465
BC	0.579	0.579	0.104	0.004	0.104	1.439	3.515	0.855	1.025	1.025	43.937	#NAME?	0.657	0.547	0.752	43.937	0.657	30.566	5.256	1.034	0.560
OC	1.501	1.501	2.431	0.090	2.431	3.080	0.185	0.594	0.712	0.712	9.782	#NAME?	1.644	1.368	1.881	9.782	1.644	18.948	16.819	6.571	0.406
CH4	1.060	1.060	1.056	1.142	1.056	392.354	49.000	3.182	3.231	1.535	4.221	#NAME?	3.024	0.198	0.763	4.221	3.024	0.630	3.000	3.575	0.360
N2O	0.750	0.350	0.102	0.119	0.102	0.111	1.100	0.638	1.712	1.712	0.600	#NAME?	0.603	0.918	0.918	0.600	0.603	0.920	0.600	1.104	2.000
CO2	59,366.9	59,282.8	59,341.6	59,385.9	59,341.6	56,808.8	59,229.3	85,040.5	85,012.9	85,040.2	84,030.9	#NAME?	85,069.7	78,163.2	78,153.7	77,148.7	78,187.5	77,452.2	72,576.8	65,371.4	77,264.4
CO2c	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?
Biogenic CO2																					

#NAME?
59332.81

Coal			Diesel	Diesel	Fuel Gas	Flare Gas	LNG	LPG	LPG	LNG	LNG	LNG
Utility Boiler	IGCC Turbine	Industrial Boiler	Heavy Duty Truck	Locomotive	Industrial Boiler	Flare Gas	Heavy Duty Truck	Industrial Boiler	Flaring Tacoma	NG Peak shaving	Marine Engine TOTE CASE	Marine Engine
1.495	0.122	0.472	5.909	5.909	2.540	2.540	26.225	4.272	4.272	2.540	#NAME?	79.908
12.417	2.235	23.955	57.875	57.875	22.210	22.210	1,452.359	3.531	3.531	24.970	#NAME?	90.798
116.035	11.902	121.631	53.121	53.121	36.400	36.400	82.257	69.413	69.413	41.050	#NAME?	2,085.241
28.841	251.841	2.663	10.052	10.052	3.507	3.507	7.416	3.738	3.738	3.507	#NAME?	18.121
20.278	73.411	2.521	4.619	4.619	3.507	3.507	3.616	3.738	3.738	3.507	#NAME?	16.675
325.406	4.110	544.401	0.545	0.545	0.269	0.269	0.000	0.000	0.000	0.000	#NAME?	0.000
0.872	3.157	0.108	0.072	0.072	0.579	0.579	0.287	0.617	0.617	0.579	#NAME?	2.501
1.643	5.946	0.204	0.125	0.125	1.501	1.501	0.521	1.600	1.600	1.501	#NAME?	6.503
1.058	1.050	1.246	4.750	4.750	1.060	1.060	309.767	1.068	1.068	1.060	#NAME?	91.620
1.586	1.581	0.857	0.175	0.175	0.750	0.750	0.033	4.806	4.806	0.350	#NAME?	2.000
100,017.1	100,037.4	100,001.6	78,076.6	78,076.6	57,408.9	68,662.0	55,095.9	68,039.6	68,754.6	58,261.1	#NAME?	57,667.7
#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?

Emissions Factors and Activity Assumptions

Source: UPDATED 2016 Puget Sound Maritime Air Emissions Inventory, Punlished Feb 2018 APPENDIX B: OGV EMISSIONS ESTIMATING METHODOLOGY (unless otherwise noted below table)

https://pugetsoundmaritimeairforum.org/2016-puget-sound-maritime-air-emissions-inventory/

The North American ECA introduced in 2015, requiring 0.1% sulfur content in diesel fuel compared to heavy fuel oil with high sulfur content (2.7%) used by the

Table B.2: Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Slow speed diesel	< 1999	Slow speed diesel < 1999	17	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	< 1999	Medium speed diesel < 1999	13.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	16	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2(	12.2	0.5	1.1	0.42	0.24	0.23	0.24
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	14.4	0.6	1.4	0.38	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2(	10.5	0.5	1.1	0.42	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.00	0.02	0.02	0
Gas turbine	All	Gas turbine All	6.1	0.1	0.2	0.6	0.1	0.04	0
Steamship	All	Steamship All	2.1	0.1	0.2	0.6	0.8	0.6	0

Medium speed means RPM>130

LNG emissions factors from "GHG and NOx Emissions from Gas Fueled Engines", SINTEF, 2017. PM emissions based on EPA certification data of 2017 Wartsila DF engine (rated at 8MW).

VOC emissions for LNG engines are estimated as NMVOC, based on a typical ratio of 3.8% NMVOC/CH4 emissions, as described in "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector", MARAD, 2015

https://www.nho.no/siteassets/nhos-filer-og-bilder/filer-og-dokumenter/nox-fondet/dette-er-nox-fondet/presentasjoner-og-rapporter/methane-slip-from-gas-engines-mainreport-1492296.pdf

https://www.marad.dot.gov/wp-content/uploads/pdf/Methane-emissions-from-LNG-bunkering-20151124-final.pdf

Sulfur emissions rates for Low Pressure DF LNG engines based on SINEF report (Table 5.1) indicating 95-98% SOx reductions from LNG operation relative to MDO. Assume pilot fuel is MDO with a 0.5% sulfur content based on 2020 global sulfur cap

Table B.2: GHG Emission Factors for OGV Main Engines Using MDO, g/kW-hr

Engine Model Year	Model Year	Key	CO2	N2O	CH4
Slow speed diesel	< 1999	Slow speed diesel < 1999	589	0.0310	0.0120
Medium speed diesel	< 1999	Medium speed diesel < 1999	648	0.0310	0.0100
Slow speed diesel	2000 - 2010	Slow speed diesel 2000 - 2010	589	0.0310	0.0120
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	648	0.0310	0.0100
Slow speed diesel	2011 - 2015	Slow speed diesel 2011 - 2015	589	0.0310	0.0120
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	648	0.0310	0.0100
Gas turbine	All	Gas turbine All	922	0.0800	0.0020
Steamship	All	Steamship All	922	0.0800	0.0020
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.0310	4.1000
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.0310	5.3000 *Methane (*

N2O emissions factors for LNG engines assumed to be equal to medium speed diesel

Table B.3: Low-Load Adjustment Multipliers for Emission Factors

Load	NOx	HC	CO	PM
2%	4.63	21.18	9.68	7.29
3%	2.92	11.68	6.46	4.33
4%	2.21	7.71	4.86	3.09
5%	1.83	5.61	3.89	2.44
6%	1.6	4.35	3.25	2.04
7%	1.45	3.52	2.79	1.79
8%	1.35	2.95	2.45	1.61
9%	1.27	2.52	2.18	1.48
10%	1.22	2.2	1.96	1.38
11%	1.17	1.96	1.79	1.3
12%	1.14	1.76	1.64	1.24
13%	1.11	1.6	1.52	1.19
14%	1.08	1.47	1.41	1.15
15%	1.06	1.36	1.32	1.11
16%	1.05	1.26	1.24	1.08
17%	1.03	1.6	1.17	1.06
18%	1.02	1.18	1.11	1.04
19%	1.01	1.11	1.05	1.02
20%	1	1	1.00	1.00

Source: 2012

Table 3.17: Composite Maneuvering Load Factors

Vessel Type	Load In	Load Out
Auto Carrier	0.04	0.06
Bulk	0.04	0.05
Containership	0.03	0.03
Cruise	0.03	0.04
General Cargo	0.03	0.04
ITB	0.04	0.06
Reefer	0.02	0.03
RoRo	0.02	0.02
Tanker	0.03	0.05

Table B.7: Auxiliary Engine Emission Factors, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Medium speed diesel	≤ 1999	Medium speed diesel ≤ 1999	13.8	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2(	12.2	0.4	1.1	0.44	0.24	0.23	0.24
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2(	10.5	0.4	1.1	0.44	0.24	0.23	0.24
Lean Burn SI LNG	All	Lean Burn SI LNG All	0.9	0.0	1.7	0	0.02	0.02	0.00
Low Pressure DF LNG	All	Low Pressure DF LNG All	1.9	0.0	1.9	0.003515	0.02	0.02	0.00

LNG emissions factors for aux engines assumed to be equivalent to main engine emissions factors as both the main and aux engines are medium speed

Table B.7: Greenhouse Gas Emission Factors for Auxiliary Engines, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Medium speed diesel	All	Medium speed diesel All	683	0.029	0.008
Medium speed diesel	2000 - 2010	Medium speed diesel 2000 - 2010	683	0.029	0.008
Medium speed diesel	2011 - 2015	Medium speed diesel 2011 - 2015	683	0.029	0.008
Lean Burn SI LNG	All	Lean Burn SI LNG All	472	0.029	4.1
Low Pressure DF LNG	All	Low Pressure DF LNG All	444	0.029	5.3

Table B.12: Auxiliary Boiler Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	NOx	VOC	CO	SO2	PM10	PM2.5	DPM
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	2	0.1	0.2	6	0.18	0.15	0
LNG Aux Boiler	All	LNG Aux Boiler All	2	0.1	0.2	0	0.16	0.15	0

Source: 2013 POLB Emissions Inventory

Table B.12: Auxiliary Boiler GHG Emission Factors using MDO, g/kW-hr

Engine	Model Year	Key	CO2	N2O	CH4
Fuel Oil Aux Boiler	All	Fuel Oil Aux Boiler All	922	0.075	0.002
LNG Aux Boiler	All	LNG Aux Boiler All	644	0.075	0.002

Source: 2013 POLB Emissions Inventory

CO2 emissions for LNG based on ratios of carbon-per-BTU for bunker fuel and natural gas, as given in ANL GREET's fuel properties worksheet
N2O emissions for LNG assumed to be equal to fuel oil. CH4 emissions for LNG scaled based on fuel oil emissions and ratios of CH4 emissions fro
and LNG engines.

Table B.18: 2016 Auxiliary Engine Power and Load Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling
Auto Carrier	590	1224	876
Bulk	266	384	157
Bulk - Self Discharging	462	807	258
Bulk - Heavy Load	305	1223	136
Bulk - Wood Chips	266	1275	157
Container - 1000	892	1275	536
Container - 2000	1280	1911	945
Container - 3000	888	1685	965
Container - 4000	1499	2528	1196
Container - 5000	1444	2458	1202
Container - 6000	1598	2665	1461
Container - 7000	1332	2675	1325
Container - 8000	1497	4769	1449
Container - 9000	1495	4551	1383
Container - 10000	1662	2617	887
Cruise	na	na	na
General Cargo	471	1096	829
ITB	79	208	102
Reefer	1247	1168	900
RoRo	132	396	229
Tanker - Aframax	556	628	909
Tanker - Chemical	417	583	1271
Tanker - Handysize	560	600	900
Tanker - Panamax	488	600	379
Tanker - Suezmax	858	1289	2902

Table B11 2016 Auxiliary Boiler Energy Defaults, kW

Vessel Type	Sea	Maneuvering	Hotelling *
Auto Carrier	0	184	314
Bulk	0	94	125
Bulk - Self Discharging	0	103	125
Bulk - Heavy Load	0	94	134
Bulk - Wood Chips	0	134	134
Container - 1000	0	213	273
Container - 2000	0	282	361
Container - 3000	0	328	420
Container - 4000	0	371	477
Container - 5000	0	473	579
Container - 6000	0	567	615
Container - 7000	0	470	623
Container - 8000	0	506	668
Container - 9000	0	613	677
Container - 10000	0	458	581
Cruise	0	361	306
General Cargo		124	134
ITB	0	0	0
Reefer	0	237	304
RoRo	0	148	259
Tanker - Aframax	0	438	5030
Tanker - Chemical	0	136	568
Tanker - Handysize	0	144	2586
Tanker - Panamax	0	351	3421
Tanker - Suezmax	0	191	5843

*using upper limit

Table 3.22: Fuel Correction Factors

Fuel Used	NOx	VOC	CO	SO2	PM10	PM2.5	DPM	CO2	N2O	CH4
HFO (2.7% S)	1	1	1	1	1	1	1	1	1	1
HFO (1.5% S)	1	1	1	0.555	0.82	0.82	0.82	1	1	1
MGO (0.5% S)	0.94	1	1	0.185	0.25	0.25	0.25	1	0.94	1
MDO (1.5% S)	0.94	1	1	0.555	0.47	0.47	0.47	1	0.94	1
MGO (0.1% S)	1	1	1	1	1	1	1	1	1	1
MGO (0.3% S)	0.94	1	1	0.111	0.21	0.21	0.21	1	0.94	1
MGO (0.4% S)	0.94	1	1	0.148	0.23	0.23	0.23	1	0.94	1
ULSD	1	1	1	1.2007	1.18	1.18	1.18	1	1	1
LNG	1	1	1	1	1	1	1	1	1	1

LNG fuel correction factors set to 1 as direct emissions factors already account for LNG engines meeting Tier 3 standards
ULSD factors based on scaling from 0.5%S to 0.1%S MGO and further scaling 0.1%S MGO to 0.0015%S

Fuel Consumption Factors	SFOC	Units	Source
Main Engine	204.33	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Aux Engine	215.34	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above
Boiler	290.71	gMDO/kWh	Implied by CO2 emissions factors, converted using CO2 emissions above

CH4) slip

m medium speed FO

Parameters	Natural Gas[a]	Flared Waste Gas[a]								
		Liquefying Case 1	Liquefying Case 2	Liquefying Case 3	Liquefying Case 4	Liquefying Case 5	Holding	LNG Transfer A1	LNG Transfer A2/A3	LNG Transfer B
Heat Content (Btu/scf)	1,093	346	466	1,644	864	1,825	1,144	506	506	223
Density (lb/scf)	0.046	0.101	0.091	0.088	0.097	0.087	0.049	0.058	0.059	0.067
Sulfur Content (ppmw)[c]	25	337	912	524	250	587	17	0	0	0
VOC Content (wt%)	NA	9.6%	14%	51%	24%	58%	17%	0.10%	0.10%	0.10%
Benzene Concentration (mg/m^3)[b]	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980
Ethylbenzene Concentration (mg/m^3)[b]	144	144	144	144	144	144	144	144	144	144
m,p-Xylene Concentration (mg/m^3)[b]	986	986	986	986	986	986	986	986	986	986
o-Xylene Concentration (mg/m^3)[b]	165	165	165	165	165	165	165	165	165	165
Toluene Concentration (mg/m^3)[b]	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570	2,570

Notes:

[a] Provided by CB&I.

[c] Based on the Williams Gas Pipeline tariff of 0.25 grains per 100 cubic feet for H2S, the past 12-month maximum total sulfur (reported as H2S by Williams Gas Pipeline) of 0.603 grains per 100 cubic feet, and sulfur from odorant of 0.23 grains per 100 cubic feet (odorant injection rates provided by PSE).

[b] From "Natural Gas Analysis"; Environmental Partners, Inc.; February 3, 2014. Most hazardous air pollutants (HAPs) will go through with the heavy hydrocarbons, but the fraction is unknown. Therefore, we conservatively assume the waste gas has the full concentration of HAP.

Do not Prin

1972-1 23. General Support

From: patty.denny@fixauto.com
To: publiccomment@pscleanair.org.
Subject: LNG project. Puyallup Sumner Chamber of commerce Supports this endeavor
Date: Wednesday, November 21, 2018 11:12:40 PM
Attachments: image001.jpg

I write on behalf of the Puyallup Sumner Chamber of Commerce to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area.

Port districts themselves exist to promote economic activity and vitality. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. It will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Patty Denny
Chair of the Board of Directors of the Puyallup/Sumner Chamber of Commerce

From: patty.denny@fixauto.com
To: publiccomment@pscleanair.org,
Subject: signed form attached from the PuyallupSumner Chamber of Commerce
Date: Wednesday, November 21, 2018 11:16:26 PM
Attachments: 20181121204915220.pdf

-----Original Message-----
From: fixpuyallup@fixauto.com <fixpuyallup@fixauto.com>
Sent: Wednesday, November 21, 2018 5:49 PM
To: Patty <Patty.Denny@fixauto.com>
Subject: Message from "RNP0026731D0E99"

This E-mail was sent from "RNP0026731D0E99" (Aficio MP C2051).

Scan Date: 11.21.2018 20:49:15 (-0500)
Queries to: fixpuyallup@fixauto.com

Puyallup Sumner Chamber of Commerce
323 North Meridian
Puyallup, WA 98372

November 21st, 2018

I write on behalf of the Puyallup Sumner Chamber of Commerce to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area.

Port districts themselves exist to promote economic activity and vitality. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

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The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Patty Jerry
Chair of the Board
Puyallup Sumner Chamber

0725-1 23. General Support







Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma. This letter reflects my comments in support of the Puget Sound Clean Air Agency (PSCAA) finalizing its SEIS consistent with the draft it issued on October 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

There are many stakeholders in the effort to reduce emissions, and even more moving parts to the actual process of doing so. In the last five years alone, the Port of Tacoma, the Port of Seattle and the Vancouver Fraser [Canada] Port Authority have created an updated Northwest Ports Clean Air Strategy with the objectives of reducing port-related air quality impacts of diesel particulate matter, reducing greenhouse gas emissions, and helping meet air quality standards and objectives for the airshed. The PSCAA itself is a partner in the implementation of this effort, along with agencies including the Environmental Protection Agency (EPA).

The PSE LNG facility is one part of the task of reducing diesel emissions. LNG fuel cuts particulate matter (PM) emissions produced by ships by more than 85%. These particulates are extremely harmful to the lung health of dock workers and those in the surrounding neighborhoods. According to dock workers, they not only see the black diesel particulates floating in the air, but they breathe them in as well while ships (still burning diesel) are waiting to dock. Besides eliminating the PM emissions, LNG fuel also reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% and nitrogen oxide (NOx) emissions by nearly 85%. Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

Reducing these real-time emissions is a matter of social justice. Port workers should not be subjected to this polluted air just for doing their jobs. Workers all across the West Coast ports have been vocal about the need to reduce these emissions in their work place, and they have played an integral role in supporting ports' efforts such as the Northwest Ports Clean Air Strategy to reduce emissions. Locating the Tacoma LNG facility within the Port of Tacoma advances the effort to reduce emissions at their source.

Beyond emissions affecting ports and immediately adjacent neighborhoods, the United States has staked out the position that vessels must control emissions when traveling America's coastlines up and down the Pacific Ocean. Annex 6 to the MARPOL Treaty, for which the EPA is the enforcing agency, requires Jones Act-flagged ships that travel near to shore to significantly reduce their emissions by using cleaner fuels. TOTE's use of fuel from Tacoma LNG to power its fast-transit, near-shore ships allows the company to substantially exceed its regulatory commitment to the EPA. By using LNG, TOTE will provide major emissions reductions benefiting public health for all communities and residents along its West Coast route, which transits nearly all of Puget Sound and ends in Anchorage, Alaska.

The Tacoma LNG facility is a project that allows multiple stakeholders – coastal communities, the Port of Tacoma, adjacent neighborhoods, PSCAA, EPA and TOTE - to affirmatively advance their interests in emissions reductions. Speaking for the dock and port workers, both our health and economic well-being are furthered by wrapping up this project's environmental review and permit effort promptly without

undue delay. Please, let's keep those good, family wage jobs at the Port of Tacoma and make the air the workers breathe healthier.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Taking into consideration the overall reduction in greenhouse gas emissions confirmed by the draft SEIS for Tacoma LNG, and the human and environmental benefits of such reductions, I fully support PSCAA finalizing its SEPA review and granting the necessary permit(s) so this important addition to our region can be completed within its new scheduled time frame.

Nicole Grant
Executive Secretary-Tresurer
MLK Labor

Patty Rose
Executive Secretary-Tresurer
Pierce County Central Labor Council

From: Penny Rowe
To: Public Comment
Subject: public comment on PSE LNG plant
Date: Monday, November 19, 2018 5:57:54 PM
Attachments: LNG_letter_scientists.pdf

Please see the attached document.

0866-1 13. LCA Inputs and Assumptions - Natural Gas Source
0866-2 19. LCA Inputs and Assumptions - End Use

October 30th, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Dear Puget Sound Clean Air Agency,

We are scientists who are in agreement that anthropogenic emissions of greenhouse gases due to the burning of fossil fuels has led to dangerous climate change, and that we must keep global temperature rise below 1.5 degrees Celsius to avoid the worst effects of climate change.

Thank you for requiring a greenhouse gas (GHG) lifecycle analysis for the Puget Sound Energy (PSE) liquefied natural gas (LNG) facility in the Port of Tacoma. We are writing in regards to the Draft Supplemental Environmental Impact Statement (DSEIS).

We disagree with the conclusion of the DSEIS that the LNG plant will reduce greenhouse gas emissions by 5% (Scenario A) or 4% (Scenario B). For two values to be considered different, scientific practice dictates that they must differ by more than their uncertainties. However, uncertainties were not given in the DSEIS, and it is evident in the DSEIS that uncertainties are large, particularly for the upstream methane leakage rate. Additionally, the DSEIS cites references that cannot be found, fails to use current values published in the scientific literature, fails to reference relevant studies, and fails to use the most current version of the model for the lifecycle analysis. Data is indicated as missing in numerous places, and incorrect units and math errors make mathematical calculations difficult or impossible to follow. We believe that if corrected to use the best available scientific methods, data, and models, it is likely that the analysis would show that greenhouse gas emissions would increase relative to the no-action alternative.

Moreover, while the proposal requires that all LNG come from British Columbia (BC), there is no discussion of what happens if BC is unable or unwilling to continue supplying LNG, or if future studies demonstrate that methane leaks in BC are higher than stated in the DSEIS. Further, the DSEIS fails to demonstrate the stability of the BC market.

The analysis assumes rather than requires that all LNG will be used to replace diesel. It also assumes additional marine shipping customers will be found, but no evidence that this is feasible is presented. To determine the likely greenhouse gas emissions, it is necessary to understand what options will be pursued if additional marine customers cannot be found so that relevant greenhouse gases can be determined (e.g. emissions due to trucking or barging of additional LNG for residential use).

0866-3 13. LCA Inputs and Assumptions - Natural Gas Source
0866-4 11. LCA Inputs and Assumptions - General
0866-5 14. LCA Inputs and Assumptions - Leakage/Slippage
0866-6 12. LCA Inputs and Assumptions - Global Warming Potential Value
0866-7 10. LCA Calculations
0866-8 10. LCA Calculations
0866-9 10. LCA Calculations

Specific details follow.

1) Sources cited for the methane leak rate in BC state that there is a high degree of uncertainty in reported values, but resulting uncertainty in the GHG emissions of the plant is not reported. References for the U.S. suggest that the methane leak rate in BC is probably underestimated.
2) Sources of greenhouse gas emission estimated to be less than 1% of the total are excluded. Given that the reduction in emissions is only 5%, the combined fraction of ignored emissions needs to be estimated and reported.
3) Several references that conclude that the methane leak rate in Canada is higher than reported are not included in the DSEIS, including a published peer-reviewed article.[1]
4) Several references for upstream methane leakage values cannot be found (e.g. "Province of British Columbia, 2018" references a website[2] where relevant data cannot be found, and it is unclear what "BC 2017" refers to).
5) The DSEIS uses outdated values for the global warming potential (GWP) of methane. The DSEIS should use the values from the most recent (AR5) International Panel on Climate Change report,[3] or the most recently reported values.[4] Given that it is essential to reduce greenhouse gases within 12 years to avoid the worst effects of climate change, emissions should be quantified for the 20-year GWP in addition to the 100-year GWP.
6) Calculations use incorrect units or have math errors, making them difficult or impossible to follow (e.g. Appendix C, Section A, page 88 and Appendix C, Section B.1, Page 102).
7) The DSEIS used version 4 of GHGenius, which is no longer available. The current, available version, with updated methane leak rates, should be used (V. 5 https://ghgenius.ca/index.php/downloads).
8) Data is missing/TBD in numerous places (e.g. Sections 2.2 – 2.4, Pages 9 - 11, 14 - 15, 18, 19, 21, 22, 24, 25).

We the undersigned believe that if these errors are corrected, it is unlikely the SEIS will show that the PSE LNG plant will reduce GHG emissions relative to the no-action alternative, and will likely show that it will result in an increase. On this basis, we ask that PSCAA deny a permit to the plant. If evidence for denying the permit is believed to be insufficient, we ask that the numerous and substantial errors in the DSEIS be corrected and the comment period be extended to allow a full review of a revised DSEIS.

For signatures by individuals, affiliations are given for reference only and do not represent the opinions or endorsement of institutions.

Thank you,

Dr. Penny M. Rowe (climate scientist, NorthWest Research Associates)
Dr. Steven Neshyba (climate scientist, University of Puget Sound)

Dr. Carrie L. Woods (ecologist, University of Puget Sound)
Dr. Jeffrey S. Grinstead (chemist, University of Puget Sound)
Dr. Barry Goldstein (geologist/hydrologist, University of Puget Sound)
Dr. Sarah Myhre (paleoceanographer, University of Washington)
Dr. M. Joan Alexander (atmospheric scientist, NorthWest Research Associates)
Dr. Daniel A. Burgard (environmental chemist, University of Puget Sound)
Dr. Dargan M. W. Frierson (atmospheric scientist, University of Washington)
Dr. Peter Hodum (conservation biologist, University of Puget Sound)
Dr. Todd Hay (data scientist, National Oceanic and Atmospheric Administration)
Dr. Gad Levy (Climate Scientist, NorthWest Research Associates)
Dr. Jeffrey J. Early (physical oceanographer, NorthWest Research Associates)
Dr. Pascale Lelong (physical oceanographer, NorthWest Research Associates)
Dr. Sarah Doherty (atmospheric scientist, University of Washington)
Dr. Eric Kunze (oceanographer, NorthWest Research Associates)

References

1. Atherton, E., Risk, D., Fougère, C., Lavoie, M., Marshall, A., Werring, J., Williams, J. P., and Minions, C.(2017), Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada, Atmos. Chem. Phys., 17, 12405-12420, https://doi.org/10.5194/acp-17-12405-2017.
2. https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/energy-mines-and-petroleum-resources
3. Myhre, G., et al. (2013a), Anthropogenic and natural radiative forcing, in Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, edited by T. F. Stocker et al., pp. 659–740, Cambridge Univ. Press, Cambridge, U. K., and New York.
4. Etminan, M., G. Myhre, E. J. Highwood, and K. P. Shine (2016), Radiative forcing of carbon dioxide, methane, and nitrous oxide: A significant revision of the methane radiative forcing, *Geophys. Res. Lett.*, 43, 12,614–12,623, doi: 10.1002/2016GL071930.

1979-1 23. General Support

From: David Schaffert
To: Public Comment
Cc: Doug Mah (Doug@dougmahassociates.com)
Subject: PSE LNG EIS
Date: Wednesday, November 21, 2018 10:48:26 AM
Attachments: image001.jpg
image002.png
image003.jpg
image004.png
Thurston Chamber PSE LNG EIS comments 11.20.18 - signed.pdf

To whom it may concern,

Please find comments by the Thurston Chamber on PSE LNG EIS. If there are any questions please feel free to contact me.

David

David Schaffert
President /CEO
809 Legion Way, Olympia, WA 98501
Ph. 360.357.3362 Cell 360 789 6045
dschaffert@thurstonchamber.com • thurstonchamber.com



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November 20, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

Email: publiccomment@pscleanair.org

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement (EIS) for the Puget Sound Energy (PSE) Tacoma Liquefied Natural Gas (LNG) project. Created in 1874, the Thurston County Chamber of Commerce is a member-based organization operating in Thurston County. The Chamber works with an array of community partnerships, ranging from private businesses, non-profits, and government, to address the challenges and opportunities before our community.

The Thurston County Chamber of Commerce supports issuing the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its LNG facility at the Port of Tacoma by the Puget Sound Clean Air Agency (PSCAA).

We believe that the Port of Tacoma is the right location for this facility. The Port is an established industrial area and the project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. The land within the Port has been reviewed by the City of Tacoma and zoned precisely for this type of industrial facility. We recognize that port districts exist to promote economic activity and vitality. The Port is a substantial economic driver in Tacoma and the greater South Puget Sound region. The construction and operation of the LNG facility will help local businesses and industries remain competitive by providing a needed supply of LNG for soon-to-be-reconfigured marine vessels. The siting of a LNG facility at the Port of Tacoma will provide a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Thurston County Chamber of Commerce also sees large environmental and health benefits associated with the transition to LNG. Recent reports indicate that LNG is a cleaner alternative to conventional fuels and that switching to LNG reduces greenhouse gas emissions by almost 15 percent and eliminates visible particulate emissions produced by ships by more than 85 percent. Switching to LNG and providing facilities to make the transition will help improve air quality and reduce health risks for the region. At the same time, switching to LNG will help local employers, like TOTE Maritime, comply with new emission standards. PSCAA, in preparing the draft SEIS, has confirmed the environmental benefits and reductions in greenhouse gas emissions. This confirmation should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide benefits to the residents and businesses of in the South Puget Sound region.

Again, thank you for the opportunity to comment on the Draft Environmental Impact Statement (EIS) for the Puget Sound Energy (PSE) Tacoma Liquefied Natural Gas (LNG) project. Please feel free to contact me by calling (360) 357-3362 or emailing DSchaffert@thurstonchamber.com if you have questions regarding our comments.

Sincerely,

Doug Mah, Director Public Policy
Thurston County Chamber of Commerce

2001-1 23. General Support

From: Peter Schrappen
To: Public Comment
Subject: Public Comment on Tacoma LNG Project DSEIS
Date: Monday, October 29, 2018 9:50:05 PM
Attachments: WMF comment letter on LNG DSEIS.docx

Please see the attached letter on behalf of the entire maritime industry in Washington state, represented as a 501C4 organization called the Washington Maritime Federation.

Regards,
Peter Schrappen, CAE

Board President, WA Maritime Federation

Peter Schrappen, CAE | Vice President & Director of Government Affairs
Northwest Marine Trade Association | 206-634-0911
NMTA: Facebook | Twitter | LinkedIn
Seattle Boat Show: Facebook | Twitter | YouTube

WASHINGTON MARITIME FEDERATION

October 29, 2018

Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101

Re: Public Comment on Tacoma LNG Facility

Dear Responsible Officials at PSCAA:

I am writing on behalf of the Washington Maritime Federation (the Federation) to provide comments on the Draft Supplemental Environmental Impact Study for the Tacoma Liquefied Natural Gas Project (DSEIS), and in support of the expeditious final permitting and completion of that liquefied natural gas (LNG) facility. The Federation is a statewide organization representing all sectors of the maritime industry—cargo and logistics, fishing and seafood processing, recreational boating, passenger vessel operations, shipyards, maritime labor and numerous support industries.

From its inception, one of the top priorities of the Federation has been to support the further 'greening' of the industry in this state. We say 'further' because Washington's ports and maritime businesses have long been leaders in environmental stewardship, whether it relates to clean water, clean air, site cleanups and remediation or species health.

One of the best recent examples of Washington State's leadership has been Saltchuk/TOTE's commitment to convert existing container ships and build new ones that use LNG as fuel. TOTE was the first container line in the world to commit to this environmental improvement, and was justifiably and universally lauded for this action when it was announced. As a result of the support from regulatory agencies and the state, TOTE moved ahead with the substantial additional investment required to convert and build these ships.

Subsequently, questions were raised about the greenhouse gas impact from use of LNG as a fuel (as opposed existing diesel fuels) to try to stop construction of the Tacoma LNG plant. We are pleased that the Puget Sound Clean Air Agency took a second look at this issue and confirmed that use of LNG as fuel would reduce CO2 emissions. As you know, this greenhouse gas reduction is in addition to the undisputed and significant reductions in particulate matter, sulfur oxides and nitrogen oxides. These latter improvements are very significant as well, as they improve air quality for the local populace—and especially for our maritime workers. In addition, LNG as fuel for vessels eliminates the risk of an oil spill.

As a result of these many environmental benefits and International Maritime Organization requirements to reduce vessel sulfur emissions, use of LNG power is now the trend in construction of vessels by environmentally conscious companies. Not only does LNG use help the environment, but a growing number of major companies are constructing vessels that use LNG, rather than low sulfur diesel with 'scrubber' technology, because it makes more long-term economic sense. Our ports are in an extremely vulnerable competitive environment. Much of the cargo that moves through them can go through any port on the west coast, and in recent years there has been a loss of market share to other ports, especially those in Canada. In order for our ports to compete successfully for the cargo, jobs and economic benefits their activity creates, we need to be able to fuel this new generation of container, cruise and other vessels. If we can't, they will take their business elsewhere.

We are fully aware that, long-term, cleaner fuels are desirable. But right now, and until commercially available non-fossil-fuel alternatives exist for these large vessels, use of LNG over diesel is by far the best available environmental alternative. For all of these reasons we urge you to follow the scientific data and issue the air permit in a timely manner, which will support Saltchuk, TOTE and Puget Sound Energy's efforts as leaders in improving the maritime environment, and will also support the competitiveness of our vital maritime industry.

Sincerely



Peter Schrappen
President, Washington Maritime Federation

Columbia Riverkeeper
407 Portway Ave., Suite 301
Hood River, OR 97031
phone 541.387.3030
www.columbiariverkeeper.org

0958-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0958-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

November 21, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave., Suite 105
Seattle, WA 98101

Submitted via email to publiccomment@pscleanair.org

RE: Columbia Riverkeeper Comments on Draft SEIS for Tacoma LNG

Dear Puget Sound Clean Air Agency,

Columbia Riverkeeper and our members are concerned with the potential development of the PSE LNG project in Tacoma. The PSE LNG project would impact regional fracked gas infrastructure, and the Draft Supplemental Environmental Impact Statement (DSEIS) for the proposal could set a troubling precedent for how Washington assesses the greenhouse gas (GHG) pollution impacts of fracked gas projects. We have a number of serious concerns about this facility's impact on public health and climate change, and the DSEIS falls short of addressing these issues.

Recently, the same company that conducted the lifecycle GHG analysis for the Tacoma LNG facility—Life Cycle Associates—also produced an analysis for Northwest Innovation Works' methanol refinery proposal in Kalama, Washington. We are concerned that both of these analyses contain similar flaws.

We urge the Puget Sound Clean Air Agency to address the following issues when writing the final SEIS for PSE's Tacoma LNG proposal:

- The greenhouse gas emissions calculations in the DSEIS do not use the best available science. The DSEIS uses outdated global warming potential (GWP) values for methane and other GHGs rather than the most recent scientific evidence from 2016.[1] If the analysis used 2016 GWP values, the LNG proposal would actually produce more GHGs than the No Action Alternative.

- The DSEIS uses the 100-year GWP for methane instead of the 20-year GWP. Because the State of Washington has aggressive GHG reduction goals, and recent studies demonstrate the urgency of reducing climate-changing pollution in the near future, the

[1] https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016GL071930

20-year GWP potential for methane is the more relevant and informative value in this context. On the same day that the DSEIS was released, the United Nations' Intergovernmental Panel on Climate Change (IPCC) released its latest report outlining pending climate change impacts.[2] The IPCC report indicates that we have only 12 years to shift away from fossil fuels to avoid severe climate disruption. If the final SEIS used the 20-year GWP for methane, it would show that PSE's LNG project is significantly more polluting than the No Action Alternative.

- The DSEIS relies on extremely low estimates for methane leakage rates in fracked gas production in British Columbia. A similar error underpins the DSEIS for the proposed methanol refinery in Kalama. The DSEIS assumes an extremely low methane leakage rate—0.32% in the GHGenius model.[3] The DSEIS also fails to incorporate recent information indicating that B.C. methane leakage rates are severely underreported.[4] As a result, the DSEIS vastly understates the contribution of GHG pollution from upstream fracked gas production that would feed PSE's proposal. Using more realistic methane leakage rates would demonstrate that PSE's LNG facility will create more GHG pollution than the No Action Alternative.

- The DSEIS assumes that all gas for the project will come from British Columbia. This assumption is unlikely to remain true through the lifespan of the project. According to the DSEIS, methane leakage estimates from U.S. sources are higher than the values the DSEIS uses for British Columbia. PSE's 2017 10K filing with the Securities and Exchange Commission shows that PSE obtained gas from British Columbia (54.8%), Alberta (19.1%), and the United States (26.1%) for PSE's natural gas customers in 2017.[5] Similarly, a significant percentage of PSE's gas supply for its power generation facilities came from non-B.C. sources in 2017.[6] The final SEIS should evaluate how much GHG pollution would come from the PSE LNG proposal if more of its gas came from sources outside of B.C. The final SEIS should also use realistic methane leakage values for all gas sources involved.

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[2] https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml
[3] Table B.3 in Appendix C, Life Cycle Associates Report.
[4] https://doi.org/10.5194/acp-17-12405-2017
[5] https://pugetenergy.com/SECfilings/PE%20-12.31.2017-10K%20Final.pdf, p. 20.
[6] *Id.* at 17.

In summary, we urge the PSCAA to address these flaws, and additional issues identified by other commenters, in the final SEIS. As written, the DSEIS likely dramatically understates the GHG pollution impact of PSE's LNG proposal.

Sincerely,



Dan Serres
Conservation Director
Columbia Riverkeeper

From: Dan Serres
To: Public Comment
Subject: Comment of Columbia Riverkeeper on PSE Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 1:05:17 PM
Attachments: 2018.11.21 CRK comment on Tacoma LNG to PSCAA final.pdf

Dear Puget Sound Clean Air Agency,

Please see the attached comment of Columbia Riverkeeper regarding the Supplemental Environmental Impact Statement (SEIS) for the Puget Sound Energy (PSE) Tacoma LNG proposal.

Thank you,

Dan Serres

--

Dan Serres | Conservation Director
Columbia Riverkeeper | 1125 SE Madison Suite 103A Portland 97214
503.890.2441 | dan@columbiariverkeeper.org

River Currents 2018 Issue 3 Newsletter—Read it Now
The Interview Edition: Superheroes vs. Big Oil; How Penalties from Columbia Riverkeeper Lawsuits Restore, Protect Clean Water; and more

1221-1 23. General Support

Carole: Thank you. Steve Sewell?

Steve: Good afternoon. My name is Steve Sewell. I'm here representing the Washington Maritime Federation as a statewide organization representing all sectors of the maritime industry, which employs about 70,000 people directly and employs, indirectly, another 70,000. Important part of our state's economy. When TOTE Maritime announced the construction of two new vessels and the conversion of two other vessels, they were understandably and justifiably praised as being environmentally responsible, for good reason.

The analyses showed all of the benefits that you've heard too many times today, in terms of reductions and NOx and SOx and particulate matter and greenhouse gases.

[02:10:05] Both of your analyses have confirmed what we believed, at the time. Several people have mentioned competitiveness. Ports here, in the maritime industry here, are particularly vulnerable. Most of the cargo that comes through our ports could go through any port on the west coast. A lot of it, recently, has been moving to British Columbia, where they will be able to fuel with LNG fueling stations. We fully understand that getting rid of fossil fuels, we, the Maritime Federation, and all of our members who operate fully on consensus, that getting rid of fossil fuels is critical. We need to do it.

But there are not options, at this time, for you can ask any naval architect or engineer, options for ocean going vessels that do not include fossil fuels, in some form. Clearly, LNG is the better solution over continuing to use heavy bunker fuels.

[02:11:05] And there are dozens of ships being built now. They are being built with dual fuel capacity. If they do not run on LNG, they will continue to run on the same dirty bunker fuels that they have been running on. This makes no sense. So, please move ahead and issue the permit without delay. Thank you.

From: Stuart Siffring
To: Public Comment
Subject: Puget Sound Energy DSEIS Comments
Date: Wednesday, November 21, 2018 12:15:23 PM
Attachments: Western Energy Alliance Comments - Puget Sound Energy LNG DSEIS.PDF

To Whom it May Concern,

Please find the attached comments on the Draft Supplemental Environmental Impact Statement for the Puget Sound Energy LNG Project. Western Energy Alliance appreciates the opportunity to comment on this important project, and looks forward to the agency taking careful consideration of the deficiencies we found in the DSEIS. Thank you,

Stuart Siffring, PE
Regulatory Analyst
Western Energy Alliance
1775 Sherman St. #2700
Denver, CO 80202
ssiffring@westernenergyalliance.org
303-501-1060

WESTERN ENERGY ALLIANCE

November 21, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Re: Public Comment on Draft Supplemental Environmental Impact Statement (DSEIS) for the Puget Sound Energy (PSE) Liquefied Natural Gas (LNG) Project

To Whom it May Concern:

The increased use of clean-burning natural gas in the United States has delivered significant air quality benefits. By displacing coal in the electricity sector, natural gas has enabled the United States to reduce greenhouse gas emissions more than any other country. Natural gas has delivered reductions of over 12% in CO_2 emissions since 2005,[1] and even larger reductions in criteria air pollutants such as 46% of carbon monoxide, 70% of sulfur dioxide, and 45% of nitrogen dioxide.[2] Natural gas has also helped the United States achieve the largest reduction in CO_2 emissions in the world.[3] Moreover, the American oil and natural gas industry has decreased methane emissions from production by 14%[4] over the last four decades at the same time it has increased production over 50%.[5]

Clean-burning natural gas can deliver similar reductions in emissions from large marine vessels. The PSE LNG Project would take advantage of the benefits of natural gas to reduce air pollutants and greenhouse gas emissions by replacing diesel fuel with natural gas. The Puget Sound Clean Air Agency (PSCAA) should approve the DSEIS and allow PSE to move forward with the project, but it should not seek to disadvantage American natural gas by dictating the use of gas sourced from British Columbia. As we detail below, the DSEIS contains flawed information that should be corrected and not used to prevent PSE from taking advantage of gas sourced from the United States.

Western Energy Alliance represents over 300 companies engaged in all aspects of environmentally responsible exploration and production of oil and natural gas in the West.

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[1] *U.S. energy-related carbon dioxide emissions in 2015 are 12% below their 2005 levels*, Energy Information Administration (EIA), May 2016.
[2] National Air Trends, U.S. Environmental Protection Agency (EPA), Summary 2017.
[3] *Statistical Review of World Energy*, BP, 2017.
[4] *Sources of GHG Emissions*, EPA, 2016.
[5] Petroleum and Natural Gas Production, EIA, 2018.

1775 Sherman St., Ste 2700 Denver, CO 80203
P 303.623.0987 F 303.893.0709 W WesternEnergyAlliance.org

1288-1 13. LCA Inputs and Assumptions - Natural Gas Source
1288-2 13. LCA Inputs and Assumptions - Natural Gas Source
1288-3 13. LCA Inputs and Assumptions - Natural Gas Source
1288-4 13. LCA Inputs and Assumptions - Natural Gas Source

Alliance members are independents, the majority of which are small businesses with an average of fifteen employees.

DSEIS Deficiencies

The most glaring flaw in the DSEIS is the provision that British Columbia (BC) be the sole source of natural gas for the facility. While PSE may choose to purchase its fuel from any supplier it desires, as is foundational to the American free-market system, enshrining an initial supplier choice in an air permit would be an inappropriate encumbrance on PSE and would prevent the company from responding to future changes in gas pricing, availability and other market conditions.

Additionally, the claim that the project "would produce a net reduction in annual GHG emissions provided that the natural gas source for the plant was British Columbia" is simply incorrect.[6] The DSEIS contains flawed accounting of the greenhouse gases (GHG) associated with production in BC. It claims, using a spreadsheet called GHGenius, that BC gas production has a total leak rate of 0.32%.[7] However, the use of a 0.32% leakage rate compared to the 1.00% leak rate used in the DSEIS for American natural gas production is based on a flawed estimate. GHGenius contains leak estimations from the gas field sector, the processing sector, and the transmission and distribution (T&D) sectors combined for a total leak estimate. But the numbers in the DSEIS for each sector are simply not based on good data.

The gas field leak estimate is based on a single study of the facilities of just one company, Seven Generations Energy, operating in the province.[8] The facilities studied are among the newest in the province and as admitted in the DSEIS, "newer wells have distinctly lower emissions than older wells".[9] Extrapolating data from just the newest facilities is not representative of the entire province's leak rate. BC oil and natural gas production has a 125 year history, and there is a very wide temporal range of production equipment. Any study that purports to represent the production of the province overall should include recent as well as older wells. The *Atherton et al.* (2017) study of 1,600 wells operated by 50 different companies found leak rates almost three times higher than what was used in the DSEIS, and was remarkably similar to leak rates for U.S. production.[10] PSCAA should not assume that BC gas has better leakage rates than American gas based on the Brandt study when other studies such as the Atherton study show that the profiles are similar.

The processing leak estimate used for BC in the DSEIS is also flawed. GHGenius lists its source for gas processing leaks as the Alberta Energy Regulator report ST13.[11] ST13 is an

[6] *Draft Supplemental EIS Tacoma LNG*, PSCAA, pg. 192
[7] Id. pg. 70
[8] *Life Cycle Assessment of Natural Gas Production*, Brandt et al., 2017
[9] *Draft Supplemental EIS Tacoma LNG*, PSCAA, pg. 193
[10] Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-109, 2017
[11] GHGenius 5.0c, Natural Gas Supply tab, Cell A217

annual account of processing plant receipts and lists gas volumes flared or vented. The glaring error is that GHGenius does not account for fugitive leaks or other unaccounted leaks in the processing equipment. It simply assumes the reported volumes vented and flared are the only losses in the processing stream. The proper method to determine processing losses is to use the "difference and others" row in the ST13 report in addition to the vented and flared rows.[12] This accounts for any difference in the gas volumes from the inlet to the outlet of the plant. Properly accounting for those factors increases the leak estimate by at least a multiple of 10. The differences between BC and U.S. leak estimates disappear if using the same methods as those used in studies from the United States.

Another discrepancy in the BC upstream emission calculations is found in the transmission and distribution sector. The source for the T&D losses in BC is the Canadian Energy Partnership for Environmental Innovation (CEPEI).[13] CEPEI uses self-reported values from members of the Canadian Gas Association to calculate T&D losses. The estimate for U.S. T&D losses is double the value used for BC, but since it comes from a much more comprehensive national inventory which includes all operators, it avoids the selection bias inherent in the CEPEI estimate.[14] The lack of national inventory numbers from a regulatory agency with access to all downstream operators makes the two leak estimates incompatible with each other.

The leak rate for BC gas assumed in the DSEIS is a clear outlier and not directly comparable to other leak estimations. Each individual component of the total leak rate is flawed in a way that dramatically understates the potential leak rates in BC oil and natural gas operations. There is simply no sound factual basis for assuming that BC natural gas is environmentally superior to U.S. gas. Therefore, the PSCAA should remove the flawed information that advantages BC gas over U.S. gas, and the air permit issued under the SEIS should not contain any restrictions on the use of American natural gas.

Regulatory Comparison

The DSEIS also contains the claim that the province has "better management practices and emission controls" than the United States.[15] EPA has comprehensive rules that regulate methane emissions from the oil and natural gas sector,[16] and even more stringent regulations to prevent hazardous air pollution from the natural gas processing and transportation sectors.[17] Individual states also have stringent environmental regulations and emission controls. For instance, Colorado implements a comprehensive suite of methane regulations for all types of exploration and production equipment.[18] North

[12] Report ST13, Alberta Energy Regulator, 2017
[13] GHGenius 5.0c, Natural Gas Supply tab, Cell A225
[14] US EPA National Inventory Report, EPA, 2014
[15] *Draft Supplemental EIS Tacoma LNG*, PSCAA, pg. 193
[16] New Source Performance Standards OOOO and OOOOa, EPA, 2018
[17] Maximum Achievable Control Technology HH and HHH, EPA, 2018
[18] Colorado Air Quality Control Commission, Regulation 7

1288-4 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1288-5 13. LCA Inputs and Assumptions - Natural Gas Source
1288-6 13. LCA Inputs and Assumptions - Natural Gas Source
1288-7 5. Regulatory Framework

Dakota similarly limits gas flaring and has requirements for controlling the emissions from production facilities.[19] British Colombia has province specific rules on the oil and natural gas industry, but they are not more protective of the environment than U.S. oil and natural gas regulations.[20]

Exploration and production in both Canada and the United States is done utilizing the same advanced, environmentally protective methods and well pad designs touted in the DSEIS. To assume that Canadian oil and natural gas companies utilize better or more advanced technology and equipment is simply incorrect. PSCAA is wrong to assume that Canadian natural gas is produced in a better, more environmentally protective manner. The DSEIS should not limit PSE to using natural gas from BC to the detriment of American natural gas which has an equal if not better environmental profile.

Interstate Commerce Clause

Finally, PSCAA could be in violation of the interstate commerce clause of the U.S. constitution if it attempts to restrict the source of natural gas to Canada and disadvantages other states in the Union. A similar attempt to limit facilities' fuel sources in Oregon faced Commerce Clause lawsuits, leading to a ruling that this practice was impermissibly discriminatory. In *American Fuel Petrochemical Manufacturers vs. O'Keeffe*, an Oregon state agency attempted to treat fuels from other states with higher carbon intensities, such as Midwest ethanol, in a discriminatory manner.[21] PSCAA is attempting the same maneuver, and could easily face a similar legal challenge.

In short, the PSCAA should approve PSE's LNG project because replacing diesel transportation fuel with natural gas carries obvious and significant benefits. Clean-burning natural gas decreases criteria pollutants as well as greenhouse gases from marine transportation. However, in the DSEIS, PSCAA is attempting to perversely limit, through an air permit, the source of PSE's LNG to Canadian natural gas using flawed assumptions that underestimate the GHG emissions from BC and overestimate emissions from the United States. The PSEIS arrives at a flawed conclusion that BC gas has a better environmental profile than U.S. sourced gas. The final Record of Decision should correct the deficiencies in the studies as noted above and should not dictate the sourcing of PSE's natural gas from BC, thereby enabling PSE to source its natural gas from the United States as well as BC. PSCAA should approve the project because it enables the displacement of diesel fueled transportation for clean-burning natural gas, but should not dictate the sourcing of that natural gas from British Columbia.

[19] North Dakota Administrative Code Title 33.1-15-20
[20] BC Drilling and Production Regulation, B.C. Reg. 282/2010
[21] *American Fuel & Petrochem. Manuf., v. O'Keeffe*, 903 F.3d 903 (9th Cir., Sept. 7, 2018).

1288-7 cont'd 5. Regulatory Framework
1288-8 13. LCA Inputs and Assumptions - Natural Gas Source
1288-9 5. Regulatory Framework
1288-10 13. LCA Inputs and Assumptions - Natural Gas Source

Sincerely,



Kathleen M. Sgamma
President

1952-1 23. General Support

From: Lauren Strauch
To: Public Comment
Cc: Chad Stokes; Ed Finklea
Subject: AWEC"s Comments on PSE"s Liquified Natural Gas Project
Date: Tuesday, November 20, 2018 5:34:38 PM
Attachments: PSE LNG - AWEC Comments.pdf

Hello,

Please find the attached comments on Puget Sound Energy's Liquified Natural Gas Project on behalf of Alliance of Western Energy Consumers.

Please let me know if you have any questions.

Thank you,

Lauren Strauch
Legal Assistant to Tommy Brooks,
Thomas Grim, and Chad Stokes

Cable Huston LLP
1001 SW Fifth Avenue, Suite 2000
Portland, Oregon 97204-1136
Office: 503.224.3092
www.cablehuston.com

CABLE HUSTON LLP

CHAD M. STOKES

cstokes@cablehuston.com
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November 20, 2018

VIA ELECTRONIC MAIL

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105,
Seattle, WA 98101
publiccomment@pscleanair.org

Re: Comments on PUGET SOUND ENERGY'S LIQUIFIED NATURAL GAS ("LNG") PROJECT

The Alliance of Western Energy Consumers ("AWEC") appreciates the opportunity to provide these comments on the draft Supplemental Environmental Impact Statement on Puget Sound Energy's ("PSE") Liquified Natural Gas Project in the Tacoma Tide Flats ("Project'). AWEC is a trade association representing commercial energy consumers in the Pacific Northwest. AWEC members include diverse commercial and industrial interests, including universities, food processing, pulp and paper, wood products, electric generation, aluminum, steel, chemicals, electronics, aerospace, and healthcare providers. The association provides an informational service to its members and participates in various regulatory matters that affect member interests.

AWEC urges the Puget Sound Clean Air Agency ("Agency") to proceed expeditiously to a Final Supplemental Environmental Impact Statement so that the Agency can recommence processing PSE's Notice of Construction. AWEC supports the Project as the least cost and least environmentally impactful way to meet growing peak day natural gas delivery needs of PSE's customers. Specifically, the Project would have the ability to vaporize LNG so that it can be used in PSE's natural gas distribution system during periods of high usage and demand (commonly known as "Peak Shaving"). AWEC also supports the Project's ability to produce LNG that will be used as a marine fuel.

AWEC was a party to an in-depth analysis of the Project as part of a regulatory proceeding before the Washington Utilities and Transportation Commission ("WUTC"). While environmental issues were not the focus of that proceeding, there was a great deal of time spent looking at other feasible alternatives, and whether the Project is the best interest of PSE's natural

gas customers. In the end, all stakeholders in that proceeding were able to reach a settlement of the issues, and the WUTC approved the settlement.[1]

The ability of the Project to meet natural gas demand on cold winter days without the need for more interstate pipeline capacity would be a tremendous resource for PSE's customers, especially when the capital costs are being shared with the TOTE Maritime fleet. If this Project is not approved, PSE will need to pursue a stand-alone natural gas Peak Shaving facility or an expansion of the Williams Northwest Pipeline system through the I-5 corridor to meet current and future customer loads. In the no action alternatives analysis, during periods of peak demand, natural gas would be diverted for use for residential, commercial, and industrial customers and duel fuel turbines generating electricity would be required to run on diesel fuel. While the no action alternative could be relied upon from time to time, it is not a long-term solution because PSE will not be able to rely on diesel back up for extended cold snaps when both gas and electric demand is at its highest.

Thank you for considering our comments.

Sincerely,



Chad M. Stokes

[1] *In the Matter of Puget Sound Energy*, Docket UG-151663, Order 10, Washington Utilities and Transportation Commission (Nov. 1, 2016).

1957-1 23. General Support

From: Swanson, Mark
To: Public Comment
Cc: Swanson, Mark
Subject: Comments
Date: Thursday, October 25, 2018 4:42:20 PM
Attachments: Potelco Support Letter.pdf

Attached please find our letter of support for the PSE LNG facility.

Mark Swanson
Executive Vice President
Potelco, Inc.
14103 Stewart Road
Sumner, WA 98390
Office 253-863-0484
Cell 253-606-1530

POTELCO INC
A Quanta Services Company
"Zero Incidents Everyday"

Puget Sound Clean Air Agency

We wish to express our support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. This specifically includes our concurrence with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and our support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing diesel or bunker fuel currently used by the maritime industry with LNG fuel.

Potelco is very familiar with the switch of fuel from diesel to natural gas. We purchased our first LNG truck in 2013 and currently have a fleet of 220 vehicles that run using LNG as fuel with additional units being placed in service. These vehicles range from Ford F550 trucks to Freightliner bucket and line trucks as well as dump trucks.

Potelco was recognized with an award for our efforts in displacing the use of diesel along with our contribution to reducing the regions greenhouse gas emissions in 2016 by Western Washington Clean Cities. Last year Potelco offset 339,457 gallons of diesel being consumed and reduced GHG emissions from our fleet by 341 tons, in addition to the constituent air quality benefits that come with the use of natural gas as a vehicle fuel.

Currently Potelco sources its LNG from locations outside of the state. We are excited to have PSE building a LNG plant within the state to support our continued use of LNG fuel within our fleet. With PSE providing us a local reliable source of fuel it will further reduce our GHG footprint with the shorter supply chain from source to end use.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like ourselves and TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, we fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

Sincerely,

Mark Swanson
Executive Vice President
Potelco, Inc.

MAIN OFFICE
14108 Stewart Road, Sumner, Washington 98390
Tel 253 863-0484 Fax 253 863-1813 800 662-8670
www.Potelco.net

From: Tyler Edgar
To: Public Comment
Subject: TOTE Maritime Alaska Technical Comments
Date: Wednesday, November 21, 2018 2:18:50 PM
Attachments: TOTE PSCAA DSEIS Technical Comments FINAL.pdf

Hi –
Attached please find technical comments from TOTE Maritime Alaska regarding the DSEIS related to the greenhouse gas lifecycle analysis on PSE's Tacoma LNG facility.

Thank you,
Tyler

Tyler Edgar | Senior Manager of Marketing and Communications | **TOTE**
32001 32nd Ave. S., Suite 200, Federal Way, WA 98001 | 253.802.6479 | www.toteinc.com
-
-

0983-1 18. LCA Inputs and Assumptions - Marine Diesel Oil
0983-2 11. LCA Inputs and Assumptions - General

November 21, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, Tacoma LNG Project
1904 Third Ave.; Suite 105
Seattle, WA 98101
(publiccomment@pscleanair.org)

To the Puget Sound Clean Air Agency:

On behalf of TOTE Maritime Alaska, we offer our feedback regarding the draft Supplemental Environmental Impact Statement. This document is intended to respond directly to the technical information in the DSEIS and the resulting modeling looking at the greenhouse gas lifecycle of the project.

We are appreciative of the effort put forth by the Puget Sound Clean Air Agency (PSCAA). The environmental and health benefits of converting to liquefied natural gas have always been the primary reason for seeking out LNG. Your review of the greenhouse gas emissions life cycle and resulting emissions reductions that are derived from the project reinforce the benefits of this transition for the communities we serve and the environments in which we work.

Below please find information and commentary regarding some specific areas within the DSEIS that we wish to draw your attention to.

I. Fuel Specifications – MDO vs. MGO

Included within information provided to the PSCAA earlier this year, TOTE indicated that it is currently using Marine Gas Oil (MGO) containing 0.1% or less sulfur content in its Orca Class vessels – fuel that is compliant with the North American Emissions Control Area. Throughout the DSEIS and associated spreadsheets, notably in the No Action Alternative, TOTE's fuel was referred to as Marine Diesel Oil (MDO). MDO is different from MGO (although both can be low sulfur distillates). The use of a consistent term is an important verbiage change to provide clarity in the final SEIS.

II. Fuel Specifications – Bunker Fuel vs. Low Sulfur Diesel

In addition to the verbiage changes, we would like to note that the fuel specifications used to assess TOTE's emissions factors and resulting greenhouse gas emissions are incorrect.

Specifically, in calculating the Fuel Consumption Factors (found on the EF Marine Vessels spec. TOTE tab in the excel files), the fuel specifications for "bunker fuel for an ocean tanker" were used. However, these fuel specifications reflect a carbon percentage by weight for a fuel containing 2.8% sulfur.

This sulfur content is similar to the sulfur found in heavier, residual blend marine fuels not fuel which, as noted in section I, TOTE is currently using in its vessels. Specifically, the calculations should use the fuel specifications associated with low sulfur diesel on the fuel specs tab in the spreadsheets.

It is worth noting that, since the North American Emissions Control Area (ECA) controls went into effect in 2015, no ships sailing within 200 nautical miles of North America has been permitted to burn fuel with sulfur content over 0.1% unless given special exception from the Environmental Protection Agency or have had exhaust gas scrubbers installed to remove sufur from the exhaust. TOTE is in compliance with the ECA and burns 0.1% sulfur fuel.

Using the fuel specifications for low sulfur diesel when calculating Fuel Consumption Factors and other related data will decrease the amount of marine gas oil (MGO) used per trip by TOTE's vessels resulting in fewer greenhouse gas emissions. We would request that you use the data for marine gas oil or low sulfur diesel in the final environmental impact statement which will not result in a change to the conclusion provided in the draft SEIS, but will provide a more accurate assessment of the impact of converting a vessel from MGO to LNG and increase the overall greenhouse gas emissions reductions.

III. Methane Emission Rates for TOTE's LNG Engines

In the DSEIS, it was noted within the data regarding the emissions factors for TOTE's specific vessels that methane emissions factor for the low-pressure DF LNG engine is 5.3 g/kW-hr.

TOTE has been working closely with MAN, the original engine manufacturer who currently has the converted engine on a test bed. Through this testing, MAN has been able to determine some initial numbers with regards to methane slip. Based on initial testing, MAN has provided data noting that the methane emission rates from the converted engine are in line with the 5.3g/kw-hr (please see Appendix 1).

Noting that this is the first conversion of its kind in the world, TOTE anticipates that MAN will continue to refine the engines while on the test bed. MAN has a strong commitment to providing the most efficient and environmentally friendly engines. As reference, MAN built the engines currently being used in TOTE's Marlin Class vessels, the world's first LNG powered containerships. When these were introduced to the Puerto Rico trade, they experienced minor methane slip. With time, MAN worked closely with the TOTE engineers to completely eliminate methane slip from these engines.

While this will not be possible with TOTE's Alaska vessels because of the engine configuration, MAN will strive to ensure minimal methane slip and engine efficiency.

IV. Using Internationally Accepted Climate Change Data

TOTE supports the use of the International Panel on Climate Change's Fourth Assessment report (AR4) and the 100 year average for Global Warming Potentials as done in the DSEIS. In doing so, the PSCAA is in line with Washington State as well as the U.S. Environmental Protection Agency (EPA). To date, the State of Washington, the US EPA and PSCAA have not adopted the Fifth Assessment Report (AR5) as the scientific standard. TOTE is regulated at both the state and national levels and follows the accepted standards of these bodies when making business and operational decisions. These regulations have been one of the driving

forces for our decision to convert our vessels to LNG. When we began this process, LNG was and remains the cleanest most environmentally friendly commercially available fuel that allows us to meet and exceed the EPA's air emissions standards.

In addition, the use of LNG as a maritime fuel is both an accepted and recommended pathway globally to address greenhouse gas emissions in the maritime sector. Ships throughout the world have been using LNG and natural gas for years, resulting in cleaner air and lower greenhouse gas emissions. In addition, recent decisions by the International Maritime Organization to drive greenhouse gas emissions reductions in the short and long term identify LNG as a key strategy to achieving the short term goals which are in keeping with the United Nations' Paris Accord which also uses the scientific standards put forth in AR4.

Using the same data that is being used by other state, regional, national and international bodies is key in order to ensure consistency and understand the different impacts of each project with regards to greenhouse gas emissions. Therefore, we support the continued use of accepted scientific standards in this DSEIS.

V. Public Health Benefits

Since the early days of this project, the public health benefits of the project have been clear. The use of LNG as a fuel significantly reduces SOx, NOx, and particulate matter, each of which contribute to respiratory problems, asthma, and in some cases premature death.

It is undeniable that the use of LNG as a fuel will drastically decrease these air emissions from TOTE's vessels. In addition, as noted in your report, the establishment of a facility in the Tideflats that could provide LNG to other ships and modes of transportation will allow other transportation companies to lower their emissions. The use of LNG throughout the transportation sector would have significant benefit on the health of Tacoma, Pierce County and south Sound residents.

For decades Pierce county has struggled with particulate matter pollution. Through significant investment, particulate emissions have been reduced. The use of LNG would further reduce particulate matter in the region.

Simply put, the use of LNG in the maritime and transportation sectors result in significant air benefits for the local community including a healthier workplace for both TOTE's employees and our labor partners in Tacoma and Alaska.

TOTE Maritime

VI. Environmental and Ecological Benefits

Finally, this project has a number of environmental and ecological benefits that we believe are worth noting.

First, the use of LNG will reduce the possibility of fuel oil spills in Commencement Bay, Puget Sound, the Gulf of Alaska and everywhere in between.

Second, TOTE's shift from diesel to LNG will eliminate diesel particulates as well as black carbon. Black carbon is a byproduct of diesel and a significant portion of particulate matter (2.5). It is also a major component of soot. More specifically, black carbon has a detrimental impact on glaciers, ice and snow fields. The dark nature of this product reduces reflectivity and speeds melting of ice and glaciers in Alaska and around the world degrading this environment.

The benefits of the black carbon reduction that results from our transition to LNG from diesel will have significant short and long-term benefits on Alaska and the Arctic.

We are appreciative of the opportunity to provide feedback and comments related to the DSEIS put forth by the PSCAA. This DSEIS provides more insight and clarity regarding the impacts of both TOTE's conversion and the construction of Puget Sound Energy's (PSE) LNG facility in Tacoma.

Following the completion of the DSEIS, we look forward to the issuance of the permit for PSE's facility to ensure that our vessels will have the necessary fuel once the conversion is complete. Please do not hesitate to be in touch with TOTE should you have additional questions regarding our vessels, operations or any of the commentary provided here.

Sincerely,

Phil Morrell
Vice President, Marine Operations
TOTE Services

Lee Peterson
Project Director (LNG)
TOTE Maritime Alaska

Kelly Scott
LNG Conversion Port Engineer
TOTE Services

Appendix 1

MAN Energy Solutions
Future in the making

Strictly confidential

Test engine status 9L58/64 DF conversion

J.Hug
PrimeServ Upgrades & Retrofits
01st September, 2018

MAN PrimeServ

Strictly confidential

Schedule test engine

Test Engine Status

Methane Emissions, Reference E2 Cycle

Strictly confidential

Load [%]	Weighted Faktor E2	CH4 [g/kWh)	CH4 [gC/kWh]	Comment
100	0.20	0	0.0	DI Mode (!)
75	0.50	6.3	4.7	Reference according to CH4 document
50	0.15	9.9	7.4	Reference according to CH4 document
25	0.15	14.7	11.0	Value not optimized yet
E2 Cycle Value		**5.3**	**4.0**	

preliminary

CH4 footprint calculation: **5.3 g/kWh** according 1st test engine results

Disclaimer

Strictly confidential

All data provided in this document is non-binding.
This data serves informational purposes only and is especially not guaranteed in any way.
Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

MAN Energy Solutions
Future in the making

Strictly confidential

Thank you very much!

J. Hug
PrimeServ Upgrades & Retrofits
+49 (0) 821 322 3077
Joachim.hug@man-es.com
01. 10. 2018

MAN PrimeServ

Carole: Thank you. The next group of five is Joe Vincenzo, Margo Rolf, Marilyn Kimmerling, Chris Chapin, I think we already heard from Chris Chapin, and Steve Sewell. So, Joe Vincenzo is first.

Joe: Respectful of all of the diversity of opinion represented here today, thank you for the opportunity to stand with other trade unionists, on behalf of our membership and share our position today. I am the port agent for the Seafarers' International Union located here in Tacoma Washington.

[02:01:01] I represent Merchant Marines, and I am a Merchant Marine myself. Seafood processors, fisheries observers totaling roughly 3,000 members, not including their families. Many of them make their homes right here in Tacoma. Maybe you've heard of them through their partnership with Paint Tacoma-Pierce Beautiful rehabilitating homes here in the community. They are good community members. They have been here, many of them, for decades, most of them, all of their lives. We've been training mariners, the SIU, in liquified gas operations off and on since 1974. SIU members have sailed safely aboard LNG vessels since 1977.

Our school, The Harry Lumberg School of Seamanship located at Piney Point, Maryland, is a trusted agent of the Coast Guard and has launched an LNG recertification program in 1997. And after a dormant period, the school relaunched a Coast Guard approved, comprehensive liquified gas course training in 2015.

[02:02:07] Why do we do this? We do this because our philosophy has always been to anticipate and stay ahead of the curve or the wave of the future. And however one defines that, I think, in principle, we all share this in common, what our future is going to be. And where the shipping industry is clearly headed is, I think, where our differences come into play. Unless ports have access to LNG, and unless the Port of Tacoma has access to LNG, ships will not be able to handle the commerce that underpins the wealth and job base in the region and right here in Tacoma.

Seafarers have been crewing TOTE ships for decades and have raise their families and supported their families here in Tacoma on the good paying union jobs with benefits for themselves and their families with vessel operators such as TOTE and others who are headquartered here and operate here in the Port of Tacoma.

[02:03:06] It's with this in mind that the SIU supports the conclusion of the supplemental EIS, and we urge you to finalize the permitting for

Puget Sound Energy Clean Energy Facility without delay. Thank you.

0658-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
NOV 5 2018
Puget Sound
Clean Air Agency

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Mark Wells / Business Agent

Address or email deadeyemark@comcast.net

UA Local 26 Plumbers and Pipefitters fully supports the LNG Plant as a clean source of energy.
We also support the economic benefit this facility will generate locally.
Furthermore, we recognize that switching from diesel to LNG is a big step in the right direction toward cleaner air and water in the Pacific Northwest.

Carole: Thank you. The next group of five, again, was Mark Wells, Steve Gilbert, Kevin Jones, Jori Adkins, and Todd Hay. So, Mark Wells?

[01:07:00]

Mark: Good afternoon. Mark Wells, business agent, Western Washington Local Plumbers, Pipefitters, and Welders. The red shirt, it was the next clean shirt in my closet. I'll keep this short and sweet, but I wanted to hit on a few numbers, most of these have already been touched on. Local 26 fully supports the LNG plant facility in Tacoma. The jobs create are going to be close to 1,000, initially. And that's not counting the indirect jobs that are going to be created. Carbon emissions, right now, we're looking at 43% of the carbon emissions in this state coming from transportation and 17% from the energy created by PSE. Very minimal.

We're also looking at a 50% reduction in PSE's energy production by the year 2040.

[01:08:00] And this is a big step, in that direction. I'm going to skip most of these figures because they've already been repeated a couple of times. But, from a personal standpoint, from a hunter/fisherman/kayaker/backpacker/climber, I spent 51 weekends out in the woods last year on the water doing all of the above. I don't think there's a person, in this room, that cares more about clean air, clean water, clean environment than an avid hunter and fisherman. Thank you for the opportunity.

1964-1 23. General Support

From: whatcombusinessalliance.com
To: Public Comment
Subject: Letter in Support of LNG Project
Date: Tuesday, October 23, 2018 12:32:56 PM
Attachments: PastedGraphic-3.png
step up (signature).png
LNG LETTER 1018.pdf

To whom it may concern,

Attached is a copy of a letter regarding the Tacoma LNG Project. Can you please confirm your receipt? Thank you.

Tony Larson, President
Direct Office Line: 360.746.0411
Cell Phone: 360.303.1651
Office Fax: 360.671.3934

2423 E. Bakerview Rd
Bellingham, WA 98226
tony@WhatcomBusinessAlliance.com
http://www.whatcombusinessalliance.com

This e-mail is confidential and legally privileged to the intended recipient and may not be otherwise distributed, copied or disclosed. If you are not the intended recipient, please notify the sender at the telephone number shown above or by return e-mail and delete this communication and any copy immediately.

WBA
Whatcom Business Alliance
Facilitating Business Success & Community Prosperity

October 22, 2018

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle WA 98101
Re: Tacoma LNG Facility

Puget Sound Clean Air Agency;

*I am the President of the **Whatcom Business Alliance.** We are a membership organization in Whatcom County that has business members from every industry that do business all over the state and world. We also have municipalities and our local Port of Bellingham as members. I am writing on behalf of our organization to provide comments and express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.*

The Port of Tacoma is the right place for a facility like this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and other state and local government services by making more public funds available to meet road and public safety needs.

2423 E. Bakerview Rd., Bellingham WA 98226
360.746.0418 www.WhatcomBusinessAlliance.com

WBA
Whatcom Business Alliance
Facilitating Business Success & Community Prosperity

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. ***Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%.*** *This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.*

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

I thank you on behalf of our membership for your consideration of this important issue.

Sincerely,



Tony Larson, President
Whatcom Business Alliance

Cc: WBA Board of Directors

2423 E. Bakerview Rd., Bellingham WA 98226
360.746.0418 www.WhatcomBusinessAlliance.com

0738-1 22. General Opposition

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

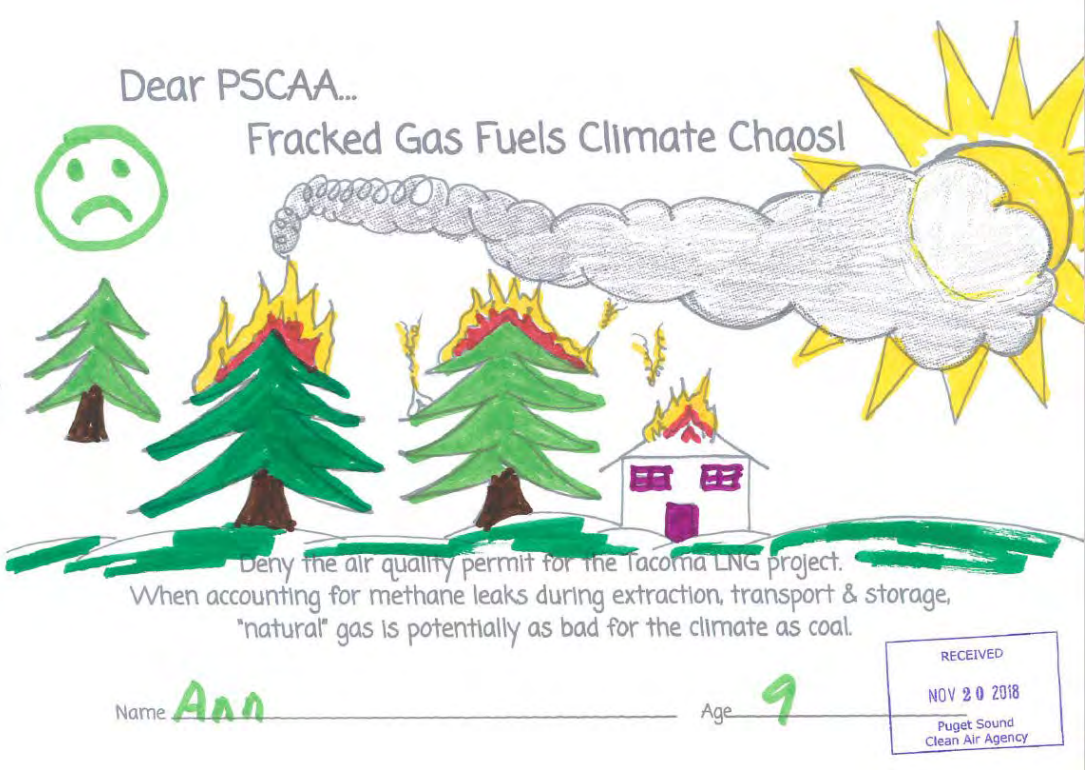
Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Allie ♡ Age ♡6♡

2470-1 22. General Opposition

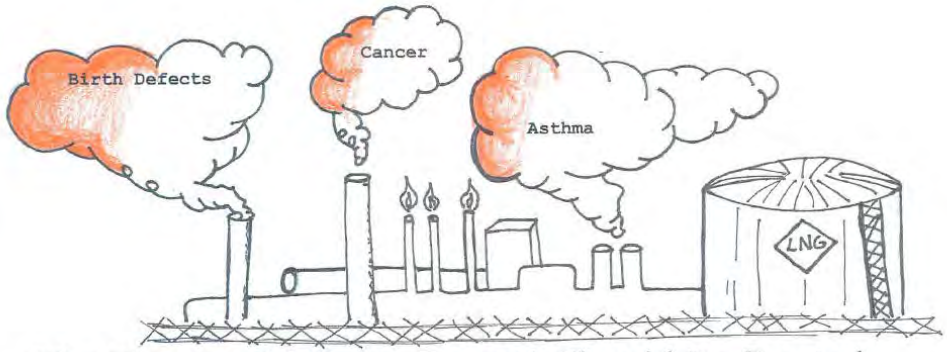


1293-1 22. General Opposition

RECEIVED
NOV 19 2013
Puget Sound
Clean Air Agency

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.
Please Value People Over Corporate Profits!

Name _____ Age _____

2473-1 22. General Opposition

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Barbara Ann Age 11

"Protect our Children"

1605-1 10. LCA Calculations
1605-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1605-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1605-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1605-5 13. LCA Inputs and Assumptions - Natural Gas Source

From: Christine
To: Public Comment
Subject: No to Fracking
Date: Sunday, November 18, 2018 9:13:42 AM

- **The Draft SEIS is Incomplete** – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- **SEIS is Using Outdated Methane Global Warming Potential Value** – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- **Analysis is based on 100-year, not 20-year, global warming potential (GWP) values** – They base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- **Questionable claims that B.C. fracked gas is as clean as they claim –** They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- **What assurances do we have that all of the fracked gas would come from BC?** They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they

1605-5 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1605-6 19. LCA Inputs and Assumptions - End Use
1605-7 14. LCA Inputs and Assumptions - Leakage/Slippage
1605-8 16. LCA Inputs and Assumptions - Hydraulic Fracturing

were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).

- **Analysis assumes credit for extra maritime customers that currently do not exist –** The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.
- **Questionable Methane Slippage Rates for TOTE Vessels –** It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells** – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Sound Clean Air Agency. Public comments will be accepted from Oct 8 to Nov 21, and a public hearing will take place on Oct 30 from 2-5 pm & 6:30-10 pm at the Rialto Theater in Tacoma

2475-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Dalton Age 11

2476-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Delila Age 8

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NOV 20 2018
Puget Sound
Clean Air Agency

2477-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name EBONIE Age 9

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NOV 20 2018
Puget Sound
Clean Air Agency

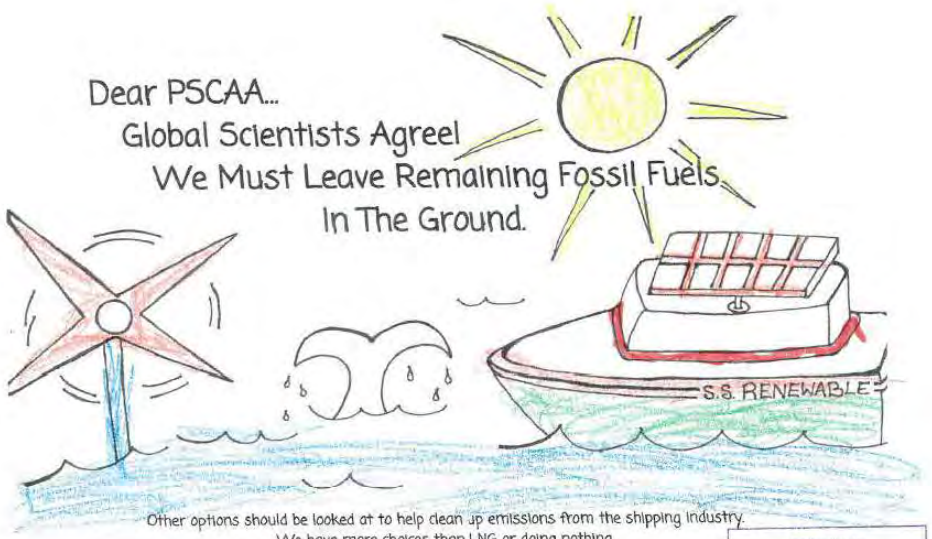
2478-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Elijah Age 9 (illegible)

2479-1 22. General Opposition

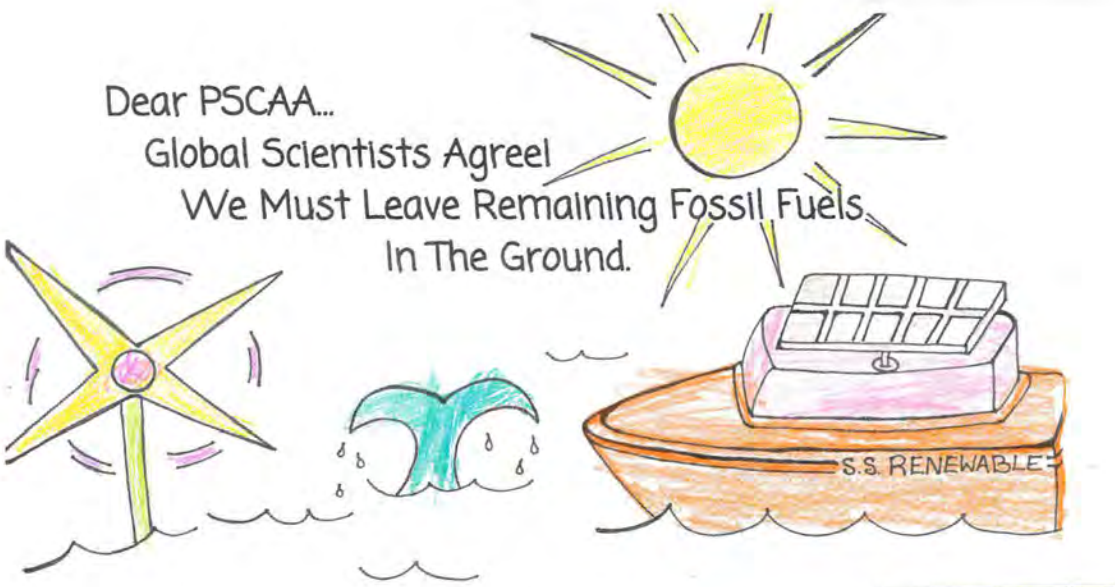


Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Hallex Age 9

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Puget Sound
Clean Air Agency

2480-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name IMYAN Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

if it got on fire it a 3 miles long and People will get hurt and that Big thing is going to be filled with that suff know that messed up.

Name Imzah Age 8

2481-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path

Name Jalyna Age 10

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

it can hunt so many people in the whole world and people and die or get canser I think.

Name dalyma Age 10 yr old

2482-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

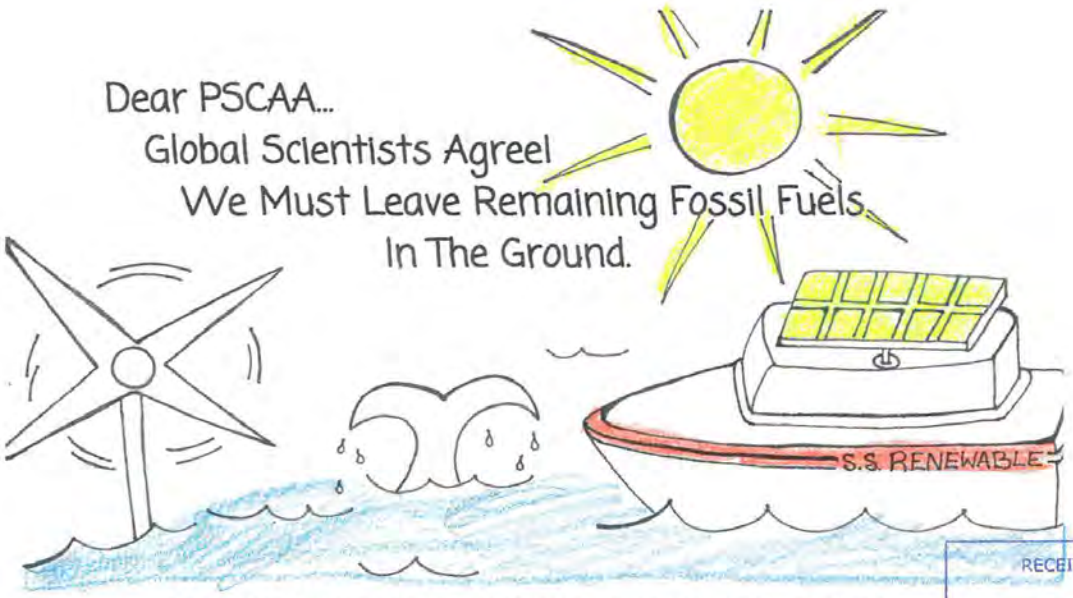
Name James Age 10

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

lots of peple will hat problems because of you.
if you make it it will be bad.
Please do not do it!!!

2483-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

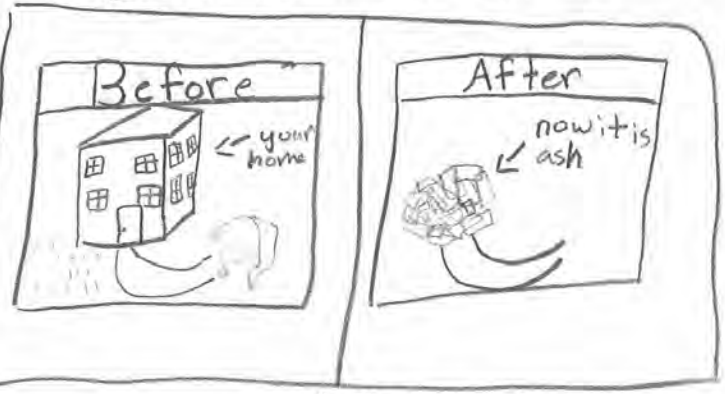
RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Name Juliana H Age 10 DOB 09/14/08

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

if you were the people who were hurt
consered you would have wrote what
my class is writing
and if you live
close by it your
home will beash



Name Jelina Age 10

2484-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Jeremiah Age 9\5

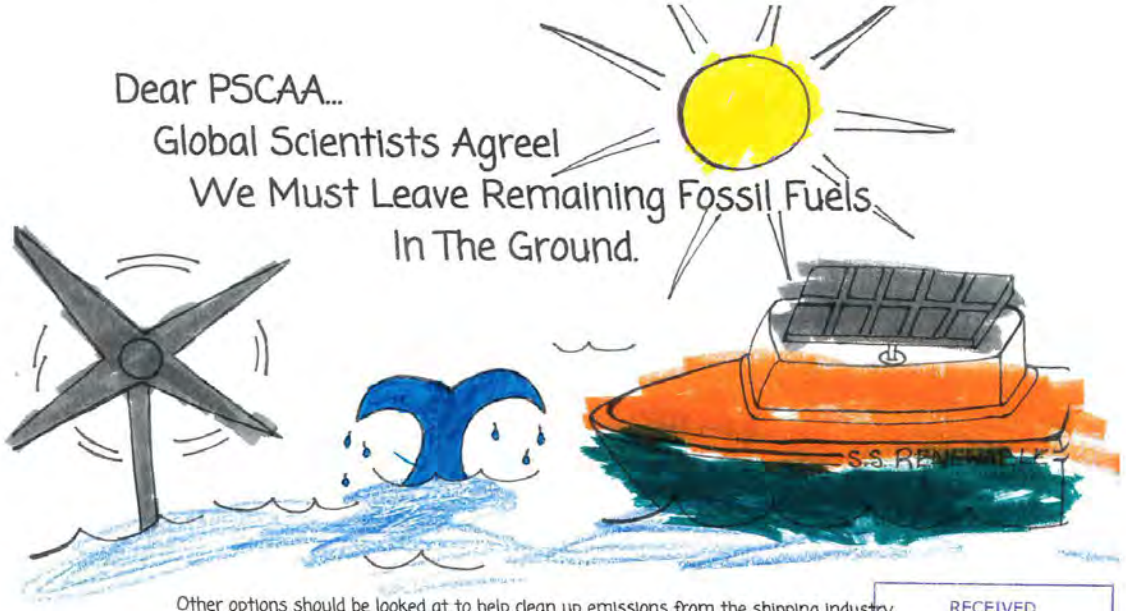
RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
alot of kids can get cancer so can your kid
Please stop we wont to stay alive think
about it.

Name Jeremiah Age 9

2485-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

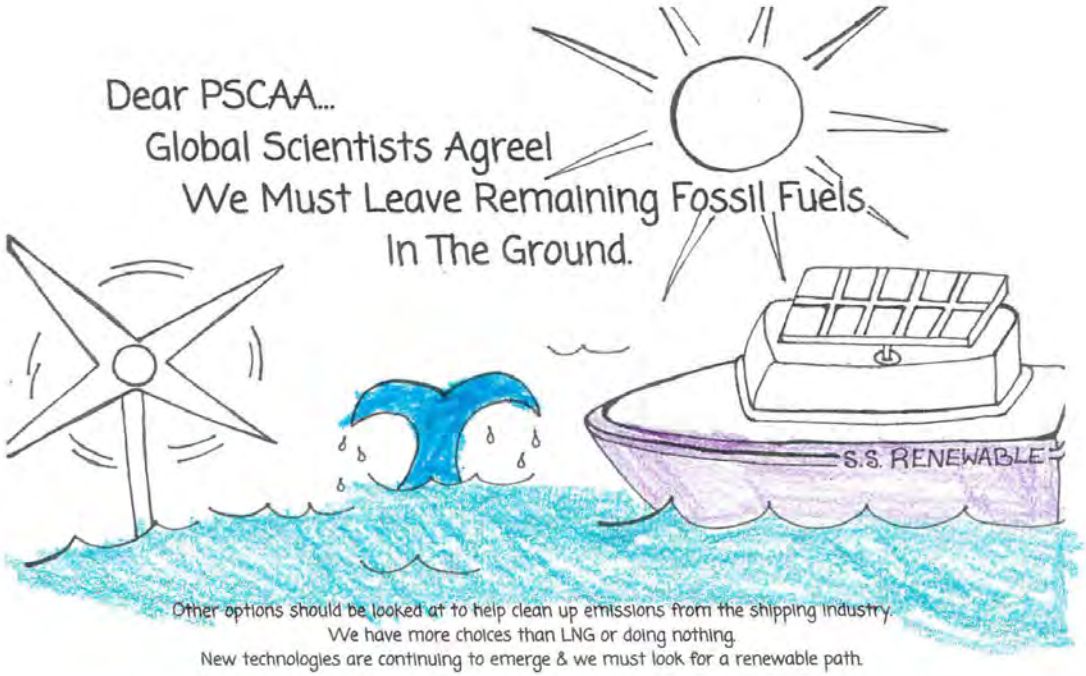
Name Joe / Age 10

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
if one tiny fire catch near there
thain the whole place can blow
up and kill lots of people.

Name Joey Age 10



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Kaleyn / Kaitlyn Age 9

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

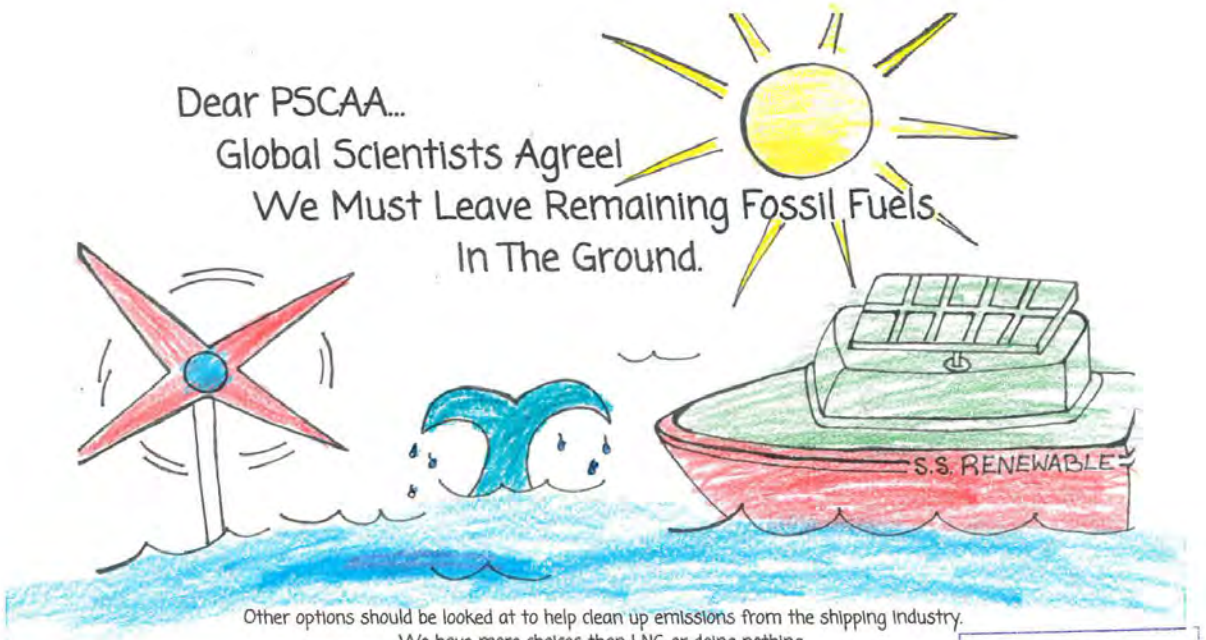
Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
Tha Prend tha wr goh Ahd SUt the
bor oh kids OS that nen Tha SUm the
Bob



Name Kaiigh Age 9

2487-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Kanai Age 47

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
it will explode a lot of people hurt!!

Name [redacted] Kamaya Age 9

2488-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Kiana Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

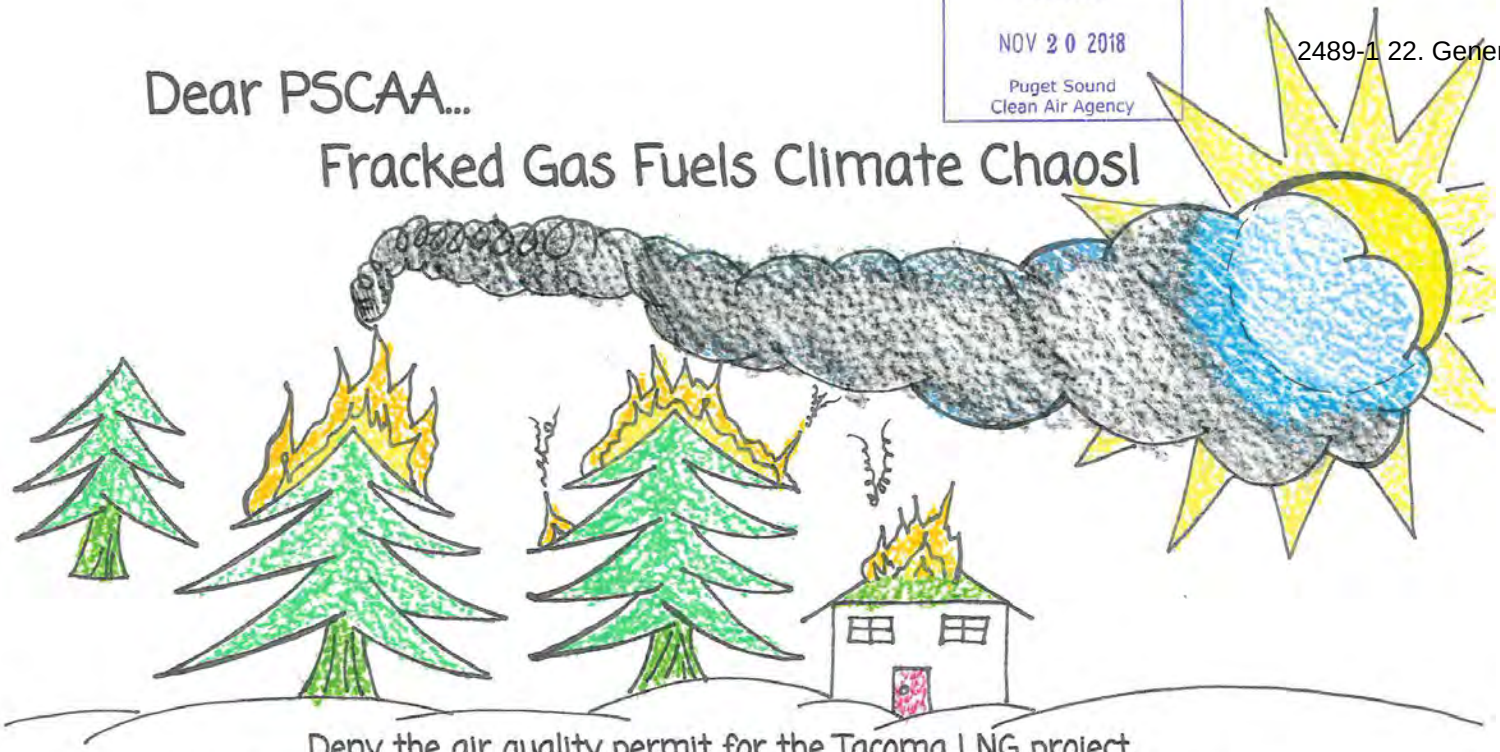
People of the comunity will get cancer what if we get cancer to? Lesten to our comunity its happness!!! Think of what happen in the future!!!

Name Kiana Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage,
"natural" gas is potentially as bad for the climate as coal.

Name For Kishan Gillespie Age 5

2490-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Kiana Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

that it can hurt a lot of people

Name Hanaung Age 10

2493-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Mateo Age 19

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
lots of people haf prodlems because of the poulushin and YOU.

Name mateo Age 10

2494-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Nha'Siyah Age 9

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

the gas that it Hlods is so bad that it can trun water to fire so if it has all of that gas and it some how gets coute on fire it can exsbode for Miles and kill people in the arae

Name Mha'Siyah Age 9

2495-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Nevae Age 8 years

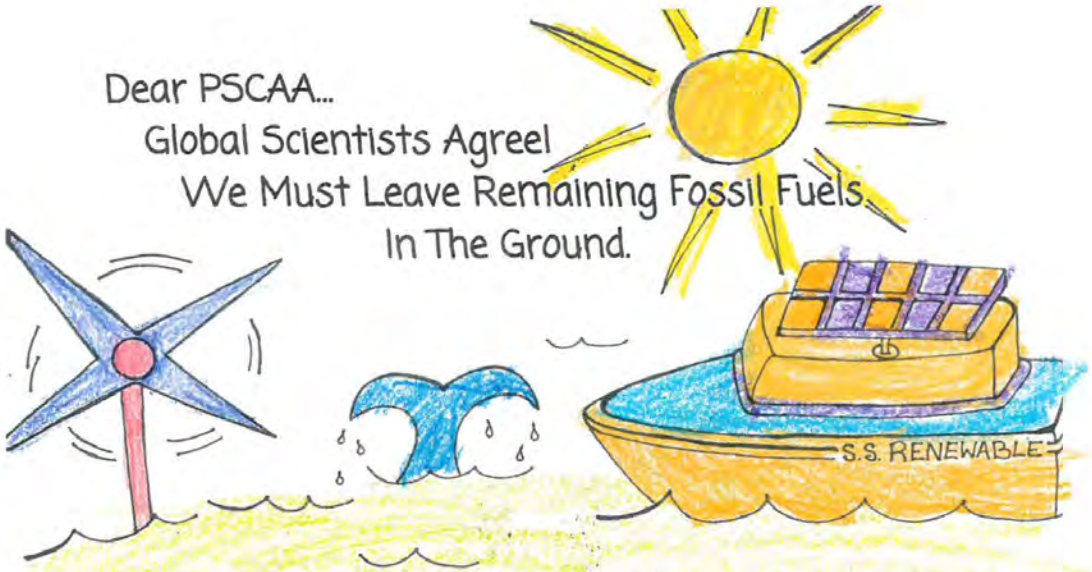
RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
it could cause people to get sick or hurt

Name Nevae Age 8

2497-1 22. General Opposition



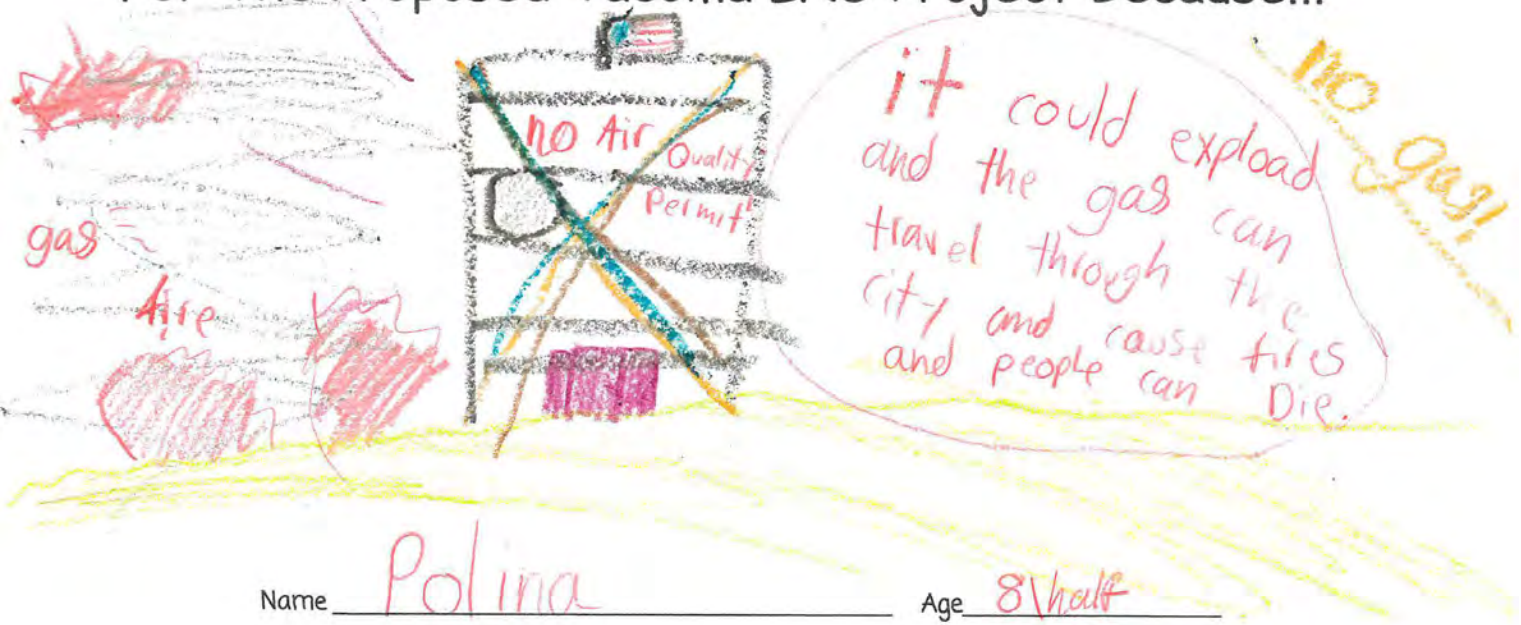
Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Polina Age 8 1/2 half

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...



Name Polina Age 8\half

Polina_acute.

1300-1 22. General Opposition

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Rumi Age 6

2471-1 22. General Opposition

Dear PSCAA...

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name _____ Age _____

1959-1 23. General Support

From: Betsy Wheelock
To: Public Comment
Subject: FW: New 2 page fax from 2538791251
Date: Wednesday, November 21, 2018 4:03:15 PM
Attachments: fax-2097386.pdf

From: Main Fax
Sent: Wednesday, November 21, 2018 11:42 AM
To: Betsy Wheelock
Subject: FW: New 2 page fax from 2538791251

From: no-reply@sendfax.io [mailto:no-reply@sendfax.io]
Sent: Wednesday, November 21, 2018 9:36 AM
To: Main Fax
Subject: New 2 page fax from 2538791251

You've received a fax!

- From: 2538791251
- To: 2063437522
- Pages: 2
- Fax Date: 11/21/2018 9:35 AM PST

November 20, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

To Whom It May Concern:

We are writing you today to urge you to complete your Supplemental Environmental Impact Statement (SEIS) and issue all the necessary air quality permits for Puget Sound Energy's proposed LNG facility and TOTE Maritime's conversion to LNG. In the greater Tacoma area, business, labor, and many others in the community have come together to support TOTE's conversion to LNG for their ORCA vessels. We believe it is important to speak up in support of TOTE's environmental leadership and their commitment to improving local air quality.

While the Puget Sound Clean Air Agency's (PSCAA) job is to fairly evaluate the impacts of the proposed LNG plant and TOTE's conversion to LNG fueled ships, it is business and labor's responsibility to ensure that vital cargo is moved safely and swiftly to Alaska and parts around the world. This benefits the customers and the communities they serve. We collectively represent businesses that supply their cargo, the dedicated employees that work on their ships, and those that work on the docks of the Port of Tacoma.

While PSCAA's analysis is extensive, it does not address the issues we face as workers or the greater business community in the local area. The men and women working on the docks and ships currently breathe diesel fumes throughout their day. We hope you consider all of us who work day to day with diesel. There is simply no doubt that LNG is a cleaner burning fuel and better for our health.

As the local business community, we embrace innovation and a healthy environment. Tacoma has transitioned to a community that promotes sustainable economic and environmentally responsible development. We believe the benefits of this project to our local air quality are immense. We project it will reduce sulfur oxides, particulate matter, nitrogen oxides anywhere from 90%-100%. PSCAA's own SEIS documents a reduction of 13.5% in greenhouse gasses.

Another tangible benefit of TOTE's conversion to LNG are the short and long-term economic stimuli to the local area. Many ports around the world are developing maritime LNG infrastructure and without LNG, many shippers will be forced to choose somewhere else. TOTE and the Port of Tacoma must stay competitive in a world market and this LNG facility would be the first of its kind in the Northwest, positioning Tacoma and the Northwest Seaport Alliance to retain existing business and compete for new opportunities. Tacoma cannot prosper without remaining competitive and investing in this cleaner fuel

upgrade will strengthen our ability to effectively compete for the world's shipping business.

We hope you remember those of us who work within the marine environment when you make your final decision. Please approve the LNG facility and TOTE's LNG conversion. It will improve our local air quality and environmental conditions down at the docks.

Sincerely,

Business Manager IUOE Local #612

Ironworkers #86

RCS IUOE Local #612

TAPCO

XGROUP RESTAURANTS, CATERING & BREWERY

Patricia Marnie Patricia & Co. Marketing firm

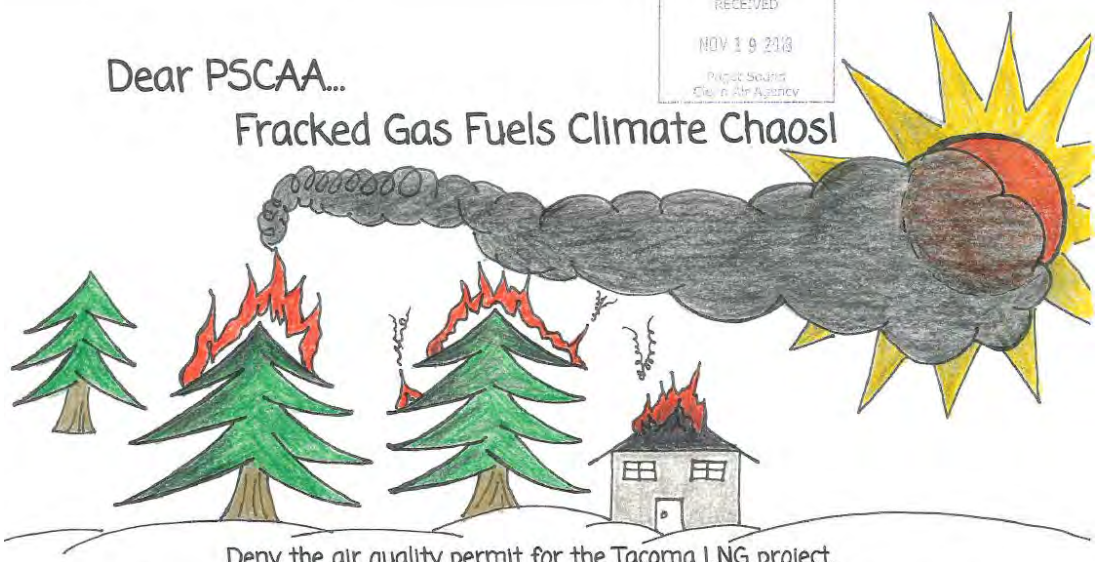
Manufacturing Industrial Council for the South Sound

1301-1 22. General Opposition

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage,
"natural" gas is potentially as bad for the climate as coal.

Name Vincent Age 5

0471-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

As a [redacted] resident of Tacoma for the past 16 years, I have become increasingly aware of, and concerned by issues of environmental injustice in our region. I stand with the Puyallup Tribe in opposing Puget Sound Energy's LNG plant at the Port of Tacoma, where a fracked gas refinery is being built in one of the most important & sacred places for the Tribe — and being built in clear violation of their treaty rights. What is truly heart breaking is that the

Please include this in the final supplemental environmental impact statement.

Name:	Phone:
Address:	Email:

0583-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about how little is known about fracked gas as it relates to our greenhouse gas emissions + climate change because the people in this state are not well-informed enough about the science + risks of this project entire Please study population awareness in the state of Washington.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Email:
Address:	Phone:

0656-1 23. General Support

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NOV 5 2018
Puget Sound
Clean Air Agency

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. This specifically includes my concurrence with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing diesel or bunker fuel currently used by the maritime industry with LNG fuel. Switching from diesel to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%. It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in.

It is also important to note that LNG powered ships will substantially exceed the North American Emission Control Area requirements established by the International Marine Organization's (IMO). The IMO regulations have required a reduction in the fuel sulfur content from 3.5 percent to 0.5 percent. Both US EPA and the Coast Guard are enforcing these fuel regulations which have been estimated by EPA to reduce mortality by as much as 30,000 people per year. TOTE has made the commitment to use LNG fuel, which provides substantially greater benefits than even the IMO regulations mandate.

Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

0740-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

-United Nations blog October 8th 2018

INCHEON, Republic of Korea, 8 Oct – Limiting global warming to 1.5ºC would require rapid, far-reaching and unprecedented changes in all aspects of society, the IPCC said in a new assessment. With clear benefits to people and natural ecosystems, limiting global warming to 1.5ºC compared to 2ºC could go hand in hand with ensuring a more sustainable and equitable society, the Intergovernmental Panel on Climate Change (IPCC) said on Monday.

The Special Report on Global Warming of 1.5ºCwas approved by the IPCC on Saturday in Incheon, Republic of Korea. It will be a key scientific input into the Katowice Climate Change Conference in Poland in December, when governments review the Paris Agreement to tackle climate change.

"With more than 6,000 scientific references cited and the dedicated contribution of thousands of expert and government reviewers worldwide, this important report testifies to the breadth and policy relevance of the IPCC," said Hoesung Lee, Chair of the IPCC.

Ninety-one authors and review editors from 40 countries prepared the IPCC report in response to an invitation from the United Nations Framework Convention on Climate Change (UNFCCC) when it adopted the Paris Agreement in 2015.

The report's full name is Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

"One of the key messages that comes out very strongly from this report is that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes," said Panmao Zhai, Co-Chair of IPCC Working Group I.

Limiting global warming

The report highlights a number of climate change impacts that could be avoided by limiting global warming to 1.5ºC compared to 2ºC, or more. For instance, by 2100, global sea level rise would be 10 cm lower with global warming of 1.5°C compared with 2°C. The likelihood of an Arctic Ocean free of sea ice in summer would be once per century with global warming of 1.5°C, compared with at least once per decade with 2°C. Coral reefs would decline by 70-90 percent with global warming of 1.5°C, whereas virtually all (> 99 percent) would be lost with 2ºC.

"Every extra bit of warming matters, especially since warming of 1.5ºC or higher increases the risk associated with long-lasting or irreversible changes, such as the loss of some ecosystems," said Hans-Otto Pörtner, Co-Chair of IPCC Working Group II.

Limiting global warming would also give people and ecosystems more room to adapt and remain below relevant risk thresholds, added Pörtner. The report also examines pathways available to limit warming to 1.5ºC, what it would take to achieve them and what the consequences could be.

"The good news is that some of the kinds of actions that would be needed to limit global warming to 1.5ºC are already underway around the world, but they would need to accelerate."

said Valerie Masson-Delmotte, Co-Chair of Working Group I.

The report finds that limiting global warming to 1.5°C would require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO2) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO2 from the air.

"Limiting warming to 1.5ºC is possible within the laws of chemistry and physics but doing so would require unprecedented changes," said Jim Skea, Co-Chair of IPCC Working Group III.

Allowing the global temperature to temporarily exceed or 'overshoot' 1.5ºC would mean a greater reliance on techniques that remove CO2from the air to return global temperature to below 1.5ºC by 2100. The effectiveness of such techniques are unproven at large scale and some may carry significant risks for sustainable development, the report notes.

"Limiting global warming to 1.5°C compared with 2°C would reduce challenging impacts on ecosystems, human health and well-being, making it easier to achieve the United Nations Sustainable Development Goals," said Priyardarshi Shukla, Co-Chair of IPCC Working Group III.

The decisions we make today are critical in ensuring a safe and sustainable world for everyone, both now and in the future, said Debra Roberts, Co-Chair of IPCC Working Group II.

"This report gives policymakers and practitioners the information they need to make decisions that tackle climate change while considering local context and people's needs. The next few years are probably the most important in our history," she said.

Special Report

The Report was prepared under the scientific leadership of all three IPCC working groups. Working Group I assesses the physical science basis of climate change; Working Group II addresses impacts, adaptation and vulnerability; and Working Group III deals with the mitigation of climate change.The IPCC is the leading world body for assessing the science related to climate change, its impacts and potential future risks, and possible response options.

The Paris Agreement adopted by 195 nations at the 21st Conference of the Parties to the UNFCCC in December 2015 included the aim of strengthening the global response to the threat of climate change by "holding the increase in the global average temperature to well below 2°C above pre- industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels."

As part of the decision to adopt the Paris Agreement, the IPCC was invited to produce, in 2018, a Special Report on global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways. The IPCC accepted the invitation, adding that the Special Report would look at these issues in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

Global Warming of 1.5ºC is the first in a series of Special Reports to be produced in the IPCC's Sixth Assessment Cycle. Next year the IPCC will release the Special Report on the Ocean and Cryosphere in a Changing Climate, and Climate Change and Land, which looks at how climate

change affects land use.

The Summary for Policymakers (SPM) presents the key findings of the Special Report, based on the assessment of the available scientific, technical and socio-economic literature relevant to global warming of 1.5°C.

Key statistics of the Special Report on Global Warming of 1.5ºC

91 authors from 44 citizenships and 40 countries of residence

14 Coordinating Lead Authors (CLAs)60 Lead authors (LAs)17 Review Editors (REs)133 Contributing authors (CAs) Over 6,000 cited referencesA total of 42,001 expert and government review comments

(First Order Draft 12,895; Second Order Draft 25,476; Final Government Draft: 3,630)

For more information, contact:

IPCC Press Office, Email: ipcc-media@wmo.int
Werani Zabula +41 79 108 3157 or Nina Peeva +41 79 516 7068

Notes for editors

The Special Report on Global Warming of 1.5 ºC , known as SR15, is being prepared in response to an invitation from the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change in December 2015, when they reached the Paris Agreement, and will inform the Talanoa Dialogue at the 24th Conference of the Parties (COP24). The Talanoa Dialogue will take stock of the collective efforts of Parties in relation to progress towards the long- term goal of the Paris Agreement, and to inform the preparation of nationally determined contributions. Details of the report, including the approved outline, can be found on the report page. The report was prepared under the joint scientific leadership of all three IPCC Working Groups, with support from the Working Group I Technical Support Unit.

What is the IPCC?

The Intergovernmental Panel on Climate Change (IPCC) is the UN body for assessing the science related to climate change. It was established by the United Nations Environment Programme (UN Environment) and the World Meteorological Organization (WMO) in 1988 to provide policymakers with regular scientific assessments concerning climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation strategies. It has 195 member states.

IPCC assessments provide governments, at all levels, with scientific information that they can use to develop climate policies. IPCC assessments are a key input into the international negotiations to tackle climate change. IPCC reports are drafted and reviewed in several stages, thus guaranteeing objectivity and transparency.

The IPCC assesses the thousands of scientific papers published each year to tell policymakers what we know and don't know about the risks related to climate change. The IPCC identifies where there is agreement in the scientific community, where there are differences of opinion, and where further research is needed. It does not conduct its own research.

To produce its reports, the IPCC mobilizes hundreds of scientists. These scientists and officials are drawn from diverse backgrounds. Only a dozen permanent staff work in the IPCC's Secretariat.

The IPCC has three working groups: Working Group I, dealing with the physical science basis of climate change; Working Group II, dealing with impacts, adaptation and vulnerability; and Working Group III, dealing with the mitigation of climate change. It also has a Task Force on National Greenhouse Gas Inventories that develops methodologies for measuring emissions and removals.

IPCC Assessment Reports consist of contributions from each of the three working groups and a Synthesis Report. Special Reports undertake an assessment of cross-disciplinary issues that span more than one working group and are shorter and more focused than the main assessments.

Sixth Assessment Cycle

At its 41st Session in February 2015, the IPCC decided to produce a Sixth Assessment Report (AR6). At its 42nd Session in October 2015 it elected a new Bureau that would oversee the work on this report and Special Reports to be produced in the assessment cycle. At its 43rd Session in April 2016, it decided to produce three Special Reports, a Methodology Report and AR6.

The Methodology Report to refine the 2006 IPCC Guidelines for National Greenhouse Gas Inventories will be delivered in 2019. Besides Global Warming of 1.5ºC, the IPCC will finalize two further special reports in 2019: the Special Report on the Ocean and Cryosphere in a Changing Climate and Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. The AR6 Synthesis Report will be finalized in the first half of 2022, following the three working group contributions to AR6 in 2021.

SECTION 3: METHANE'S DEADLY RISE

A 2016 Harvard study found that methane emissions in the United States increased by over 30 percent between 2002 and 2014.[4] This domestic increase accounted for a substantial share—by some estimates, a majority or more—of the total growth in methane emissions that occurred worldwide over that time period.

An academic study adopted by the United Nations predicts that without an immediate reduction in methane and other carbon emissions, we are in grave jeopardy of reaching a 1.5 degree (Celsius) warming by the year 2030 and continuing to a 2 degree increase soon after.[5] These are considered the thresholds above which the worst effects of climate change are likely to occur.

With this warming trend, we will not meet the goals set under the Paris Climate Agreement, the landmark climate plan signed by every country but the United States. The Paris Agreement has been upheld by thousands of U.S. cities, states and businesses despite the Trump Administration's stated intention to abandon the agreement in 2020.[6]

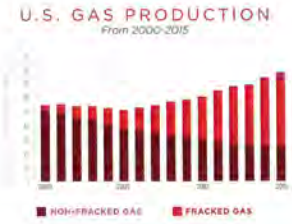


Washington's climate future with current emission trends:[7]

- *38 to 46 percent less snow than 1916-2006 by the 2040s*
- *Up to 400 percent increase in wildfire size with 1 more degree (Celsius) of warming[8]*
- *Up to 109 percent increase in ocean acidity compared to before 2005*

SECTION 4: THE GAS INDUSTRY'S ROLE IN METHANE EMISSIONS

Fracking has increased dramatically in recent years. The Energy Information Administration reports that about two-thirds of all natural gas production in the United States now comes from fracked wells, compared to less than 10 percent in 2000.[9] During that time, the average daily gas production from fracking has increased by about 1,200 percent. And according to the Environmental Protection Agency's (EPA's) 2017 U.S. Greenhouse Gas Emissions Inventory, the oil and gas industry is the second-largest source of methane emissions in the United States, contributing over 30 percent of all domestic methane pollution.[10]



SECTION 5: HOW MUCH METHANE IS LEAKING?

"Natural gas is not a bridge—it's a gang plank"

—Michael Brune, Sierra Club executive director

Just how bad is gas for the climate? That depends on how much methane is leaked before it is burned. Researchers have concluded that at leakage rates exceeding 3.2 percent of total production, the lifecycle climate impacts of burning gas are the same as those of burning coal.[11] So are leakage rates actually this high?

Studies indicate that the upstream methane leakage rates in the gas industry vary significantly from one production site to the next, as well as from one geological basin to the next, making it difficult to settle on a single average number. To the extent that researchers *have* calculated average emission rates from gas production, the most common global estimate is about 3 percent.[12] Although not all geologic formations in the United States necessarily reflect this estimated global average, studies of gas-producing basins in the West,[13] such as the Denver-Julesberg Basin, the San Juan Basin, the Uintah Basin, and the Los Angeles Basin,[14] indicate some of the highest leak rates in the country, often exceeding the global 3 percent average.

Furthermore, these figures only account for leakage that occurs between initial production and delivery to local distribution systems. Therefore, they don't capture leaks that occur while the gas is being moved *within* those distribution systems or at end-use facilities, implying that a 3 percent estimate may be conservative in many cases.

A 2016 study by the Environmental Defense Fund of 65 large oil and gas companies found that only:

- Only 14 percent of companies reported their methane leakage rate
- Zero companies had methane emission reduction targets
- One company thoroughly addressed how it planned to prevent leaks

Although Exxon recently announced plans to reduce methane voluntarily, the vast majority of gas companies have not taken active steps to address emissions from existing equipment and show no indication that they intend to do so soon.

EPA's Greenhouse Gas Reporting Program requires companies to report their methane pollution. However, companies are able to exploit numerous loopholes that cause under-reporting of these emissions. These loopholes include:

- Completely excluding facilities under a certain size from the Program's requirements
- Exempting certain kinds of equipment, activities, and practices in the oil and gas industry from the Program's requirements, even though we know they emit methane
- Frequently relying on estimates rather than direct measurement

Making matters worse, one of Scott Pruitt's first orders of business when President Trump selected him to lead EPA was to cancel the agency's request for more information on opportunities for reducing methane emissions and to reconsider important safeguards against methane emissions from new oil and gas equipment, which the Obama Administration put in place last year.

SECTION 6: THE GAS INDUSTRY'S BURDEN OF PROOF

To the extent that there is uncertainty about the level of upstream emissions, the evidence points in one direction only: emissions are higher than industry currently estimates. The only way to quickly ensure accountability for the true magnitude of fracked gas's impact on the climate is to shift the burden of proof onto the gas industry. Fair yet minimal standards need to be established immediately. If the gas industry disagrees, then they can prove otherwise. Unless and until we shift the burden of proof, we will not know just how bad the problem truly is.

WHERE FRACKED GAS COMES FROM



SECTION 7: FRACKED GAS POLICY RECOMMENDATION

Due to the extreme climate harm caused by methane emissions and the current lack of general accountability, proactive measures are needed.

As noted above, while the estimated global average emission rate for gas production is 3 percent, studies show that leakage rates at production sites in the West—where Washington sources most of its gas—may exceed this figure. To begin addressing this under-recognized climate threat, **we recommend four essential steps to address the gas problem.**

(1) As a baseline matter, projects in Washington State should assume a 3 percent overall leakage rate of methane. This modest standard reflects the global average leak rate, and is conservative in light of high average leak rates in the West and the additional losses that occur within distribution systems or at end-use facilities.

(2) This 3 percent standard should be applied **unless each company with a gas project can provide clear evidence that the leakage rate associated with that particular project is, in fact, below this 3 percent standard** (for instance, if it sources gas from a geologic basin with valid evidence of lower rates). The burden of proof for adopting a project-specific

Washington Current Proposed Projects

- *Kalama methanol refinery*
- *Tacoma liquefied natural gas facility*
- *Puget Sound Energy and Avista proposed gas plants*

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SECTION 1: THE TRUE CLIMATE DAMAGE OF FRACKED GAS

There's nothing "natural" about natural gas. The introduction of fracking has transformed the industry and made fracked gas into one of the largest threats to our climate. Although fracked gas produces less carbon emissions than coal when burned, the production, processing, storage, transmission, and distribution of fracked gas leaks into the atmosphere immense amounts of methane, which is a much more destructive pollutant for our climate than carbon dioxide. **When accounting for methane leaks, fracked gas has climate impacts that rival those of coal.**

Two-thirds of all gas produced in the U.S. is fracked. In this report, we refer to all gas as "fracked" gas because any increase in gas infrastructure will also lead to a sustained increase in the harmful practice of fracking.

CLIMATE IMPACTS OF GAS VS. COAL



To meet our long-term climate reduction goals, we must first stop making the problem worse by halting all new or expanded uses of fracked gas, including new power plants, the Kalama methanol refinery, and the Tacoma liquefied natural gas facility. Then we must systematically retire all existing gas plants.

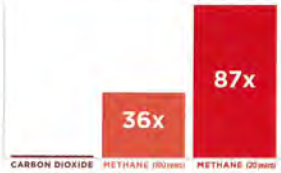
To address other climate emissions, we also must electrify as many vehicles as possible and replace gas appliances such as hot water heaters and furnaces with devices that are powered by a clean electricity grid. To that end, a truly clean electricity grid becomes an essential anchor for addressing global warming.

SECTION 2: WHY FRACKED GAS IS SO DAMAGING

When burned at the power plant, fracked gas emits about half as much carbon dioxide as a typical coal plant to generate the same amount of energy.[1] However, unburned fracked gas consists primarily of methane. While carbon dioxide remains in the atmosphere for longer than methane, methane has a much stronger climate warming effect. **When methane is leaked directly into the atmosphere, it is 36 times more powerful at trapping heat than carbon dioxide when its impact is averaged over a 100-year period. Over a 20-year period, methane's heat-trapping impact is 87 times more powerful than that of carbon dioxide.[2,3]**

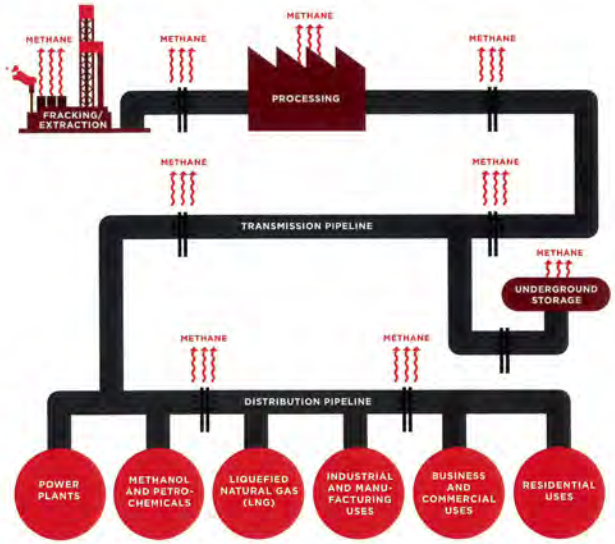
METHANE VS CARBON DIOXIDE

Global Warming Potential (GWP)



LIFECYCLE FLOW OF FRACKED GAS

Methane Leaks from Beginning to End



Coal, oil, and natural gas are the primary sources of human-caused climate change. Coal use has seen a dramatic decline in recent years and rapid advances in electric vehicle technology offer the promise of reduced oil use. However, natural gas—which, in the United States, comes primarily from the environmentally-destructive practice of hydraulic fracturing, or "fracking"—is on the rise. **Fracked gas is the next big climate fight in Washington State.**

standard should be on the project proponent, because the gas industry is the keeper of all crucial information about leakage rates. As such, if the proponent is confident that the 3 percent standard is inaccurate, it is in the strongest position to disprove this standard.

(3) State and local agencies use the more urgent 20-year Global Warming Potential, at which the climate-disrupting impact of methane is 87 times greater than that of carbon dioxide. Not only does the 20-year potential more accurately correspond to the average 12-year atmospheric lifetime of methane molecules than the 100-year potential, the urgency of climate impacts is with us now which merits using nearer-term impacts as the standard.

(4) All state and local agencies, including but not limited to those listed below, should include this 3 percent methane leakage rate and the 20-year Global Warming Potential when assessing the climate impacts of all fracked gas power plants, methanol refineries, LNG facilities, and all other projects and infrastructure in Washington State.

- The State Legislature
- The Utilities and Transportation Commission
- The Department of Ecology
- The Department of Natural Resources
- State and local government siting and permitting agencies
- State and local air agencies

SECTION 8: FRACKED GAS: A BRIDGE TO NOWHERE

As coal plants are shuttered across the United States, our decisions for energy replacement options will affect our climate, our health, and our security for years to come.

The fossil fuel industry has long touted gas as a "bridge" to a carbon-free energy mix, asserting reductions in climate pollution while clean energy technology develops. The truth is that our clean energy future is here now, creating jobs and cutting pollution through solar, wind, and energy efficiency projects. The gas plants we build now will likely be with us for decades to come. We must more rapidly reduce our reliance on fossil fuels and replace them with truly clean alternatives, such as wind, solar, and energy efficiency, not build a new fossil fuel backbone for our energy grid at a time when clean energy is cheap and plentiful.

SECTION 9: BIG PROBLEMS BEYOND CLIMATE

Climate impacts from fracked gas are one aspect of a larger problem; concerns about this dirty fuel run much deeper and deserve intense scrutiny. Many of these additional impacts are of primary concerns for communities living on the frontlines where these impacts occur. They include (but are not limited to):

- Contaminated groundwater from fracking
- Earthquakes from fracking
- Explosions due to leaking pipelines and storage facilities
- Nitrogen oxides and other air pollutants from smokestacks at end-use facilities
- Upstream emissions of traditional air pollutants, such as smog- and soot-forming volatile organic compounds and air toxins such as benzene, a known carcinogen

ENDNOTES

1. *U.S Energy Information Administration, 2017 (8 June) frequently asked questions: 'How much carbon dioxide is produced when different fuels are burned?'*
2. *Environmental Protection Agency, 2017 website: 'Understanding Global Warming Potentials'*
3. *Department of Energy, 2015 paper 'Greenhouse Gas Emissions and Fuel Use within the Natural Gas Supply Chain' – Sankey Diagram Methodology (p. 10, footnote 11).*
4. *A. J. Turner, et. al., 2016 (2 March) research letter: 'A large increase in U.S. methane emissions over the past decade inferred from satellite data and surface observations.' Geophysical Research Letters*
5. *Drew Shindell, 2012 (13 January) research article: 'Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security', Science*
6. *We Are Still In, 2016 (5 June) press release: 'Leaders in U.S. Economy Say 'We Are Still In' on Paris Climate Agreement'*
7. *Snover, A.K, G.S. Mauger, L.C. Whitely Binder, M. Krosby, and I. Tohver, 2013 (December) report: 'Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers'. State of Knowledge Report prepared for the Washington State Department of Ecology, Climate Impacts Group, University of Washington*
8. *Union of Concerned Scientists, 2014 infographic: 'Western Wildfire and Climate Change'*
9. *U.S. Energy Information Agency, 2016 (05 May) 'Today in Energy: 'Hydraulically fractured wells provide two-thirds of U.S. natural gas production'*
10. *Environmental Protection Agency, 2017 (13 April) report: 'Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015'*
11. *Ramón A. Alvarez, 2018 article: 'Greater focus needed on methane leakage from natural gas infrastructure', Proceedings of the National Academy of Sciences of the United States America*
12. *Rhodium Group, April 2015, 'Untapped Potential: Reducing Global Methane Emissions from Oil and Natural Gas Systems', at 7-8; and Environmental Science and Technology, June 26, 2014, 'Natural gas fugitive emissions rates constrained by global atmospheric methane and ethane'.*
13. *Geophysical Research Letters, Vol. 40, 1–5, doi:10.1002/grl.50811, 2013, Methane emissions estimate from airborne measurements over a western United States natural gas field: a western United States natural gas field*
14. *Journal of Geophysical Research, May 27, 2013, 'Quantifying sources of methane using light alkanes in the Los Angeles basin, California'*
15. *Environmental Defense Fund, 2016 (January) report, 'Rising Risk: Improving methane disclosure in the oil and gas industry', EDF + Business*

Additional References

Adam Voiland, 2016 (8 March) article: 'Methane Matters: Scientist Work to Quantify the Effects of a Potent Greenhouse Gas', National Aeronautics and Space Administration: Earth Observatory

Douglas Arent, Jeffrey Logan, Jordan Macknick, et. al., 2015 report: 'A review of water and greenhouse gas impacts of unconventional natural gas development in the United States', MRS Energy & Sustainability: A Review Journal

Jordan Wilkerson, 2015 (11 October) blog: 'Why the EPA is Addressing Methane: the Other Greenhouse Gas', Harvard University, The Graduate School of Arts and Sciences

Gayathri Vaidyanathan, 2015 (22 December) article: 'How Bad of a Greenhouse Gas Is Methane?', Scientific American

Union of Concerned Scientists, 2013 (October) report: 'The Climate Risks of an Overreliance on Natural Gas for Electricity'

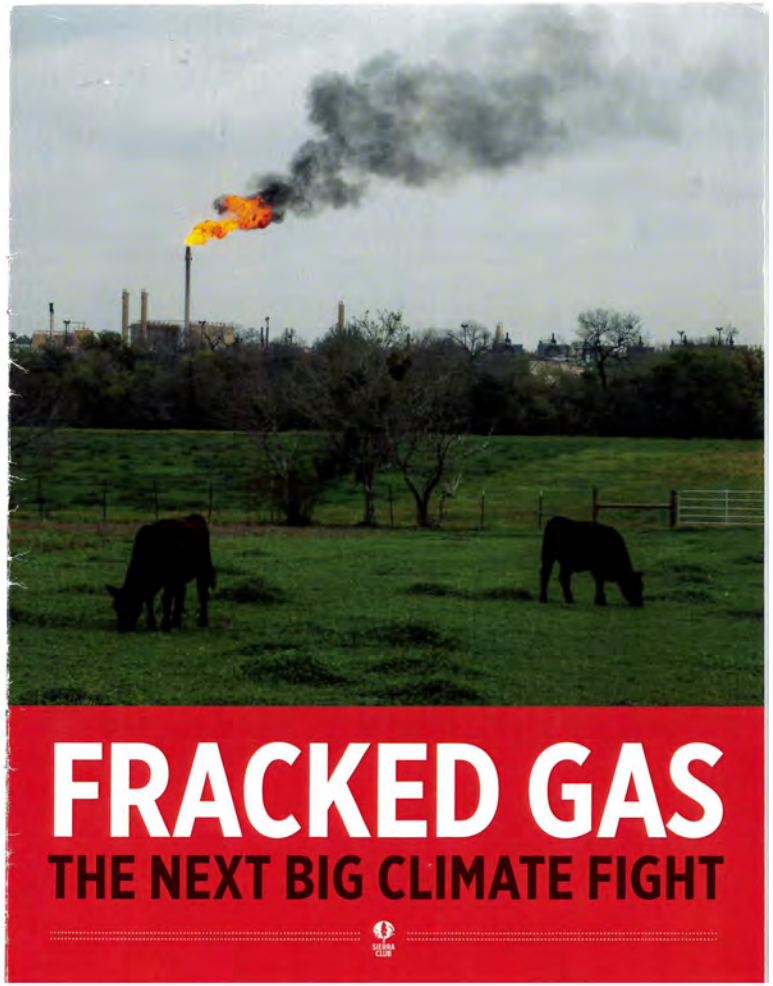
ACKNOWLEDGMENTS

1. *All information is attributable to Sierra Club only*
2. *Thanks to Tarika Powell at Sightline Institute for research, analysis, and editorial review*
3. *Special thanks to energy policy intern Liam Moser of Western Washington University for research, writing and conceptual framework*
4. *Cover photo from Greenpeace, Cattle Grazing near Hydrofracking Installation in Texas*

CONTACT

For more information, contact ***doug.howell@sierraclub.org***
Sierra Club, 180 Nickerson Street, Suite 202, Seattle, WA 98109

SIERRA CLUB



FRACKED GAS

THE NEXT BIG CLIMATE FIGHT

SIERRA CLUB

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

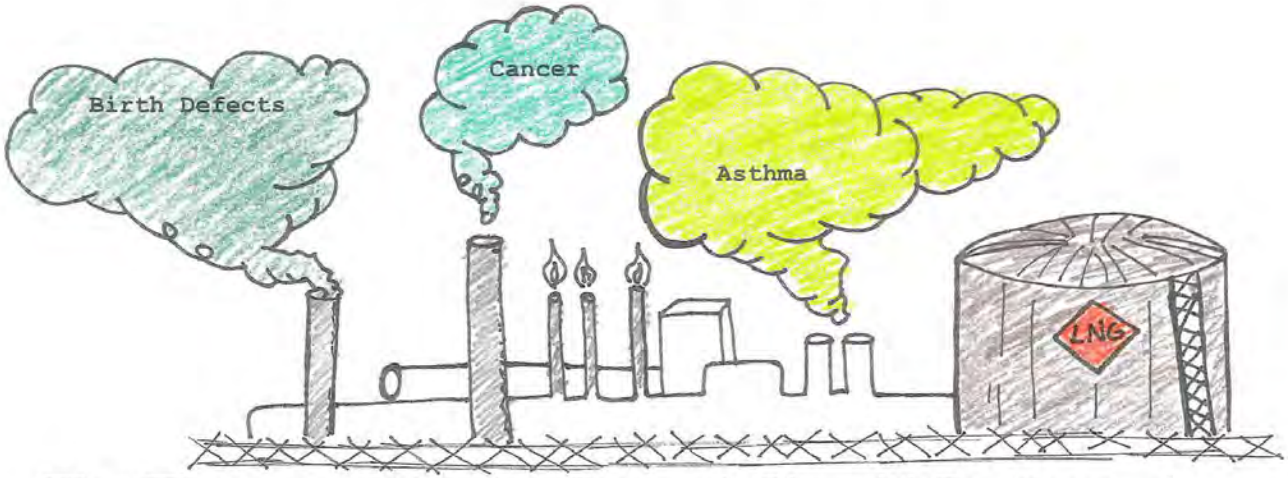
Name _____ Age _____

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

RECEIVED
NOV 3 0 2022
Puget Sound
Clean Air Agency

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.

Please Value People Over Corporate Profits!

Name _____ Age_____

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

0747-1 22. General Opposition

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.
Please Value People Over Corporate Profits!

Name _____ Age _____

1906-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The Puyallup tribe doesn't want it. We have done enough bad things to the Indians.
Liquified natural gas is also dangerous, as it can leak and also explode. Actually we should not help in any way. TO→

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: _____ Email: _____

Address: _____

By completing this comment card you agree to receive updates about the project.

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2133-1 3. Outside of SEIS Scope

I am concerned about how little is known about fracked gas as it relates to our greenhouse gas emissions + climate change because the people in this state are not well-informed enough about the science + risks of this project entire Please study population awareness in the state of Washington.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Email:
Address:	Phone:

2472-1 22. General Opposition

Dear PSCAA...

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name For those not born yet Age _____

2498-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Prince Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

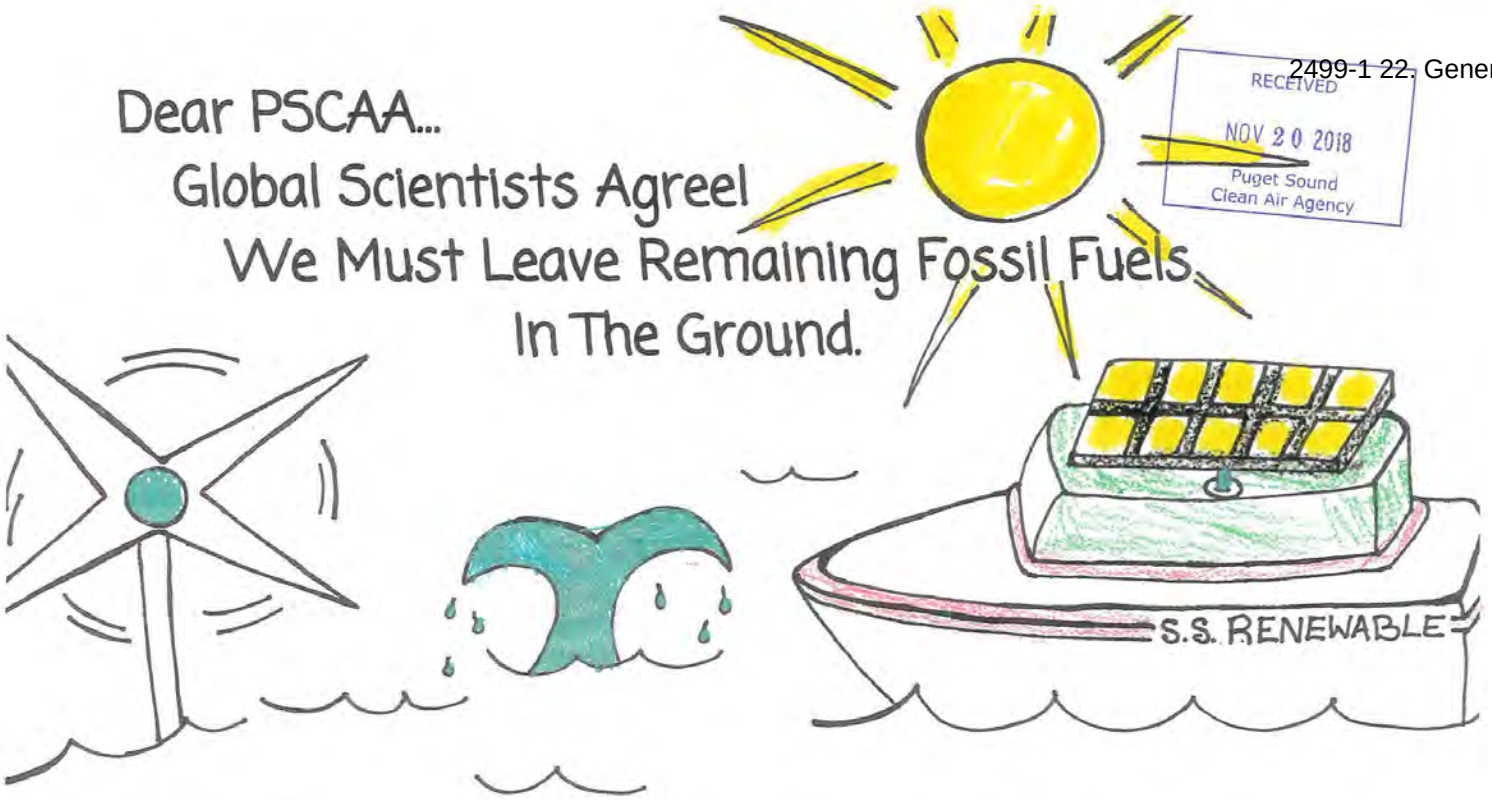
Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
how far it goses if it explodes.

Name Prince Age 8

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Global Scientists Agree! We Must Leave Remaining Fossil Fuels In The Ground.



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name [redacted] Ruby Age 9 [redacted]

2500-1 22. General Opposition

Dear PSCAA...

Global Scientists Agree!

We Must Leave Remaining Fossil Fuels

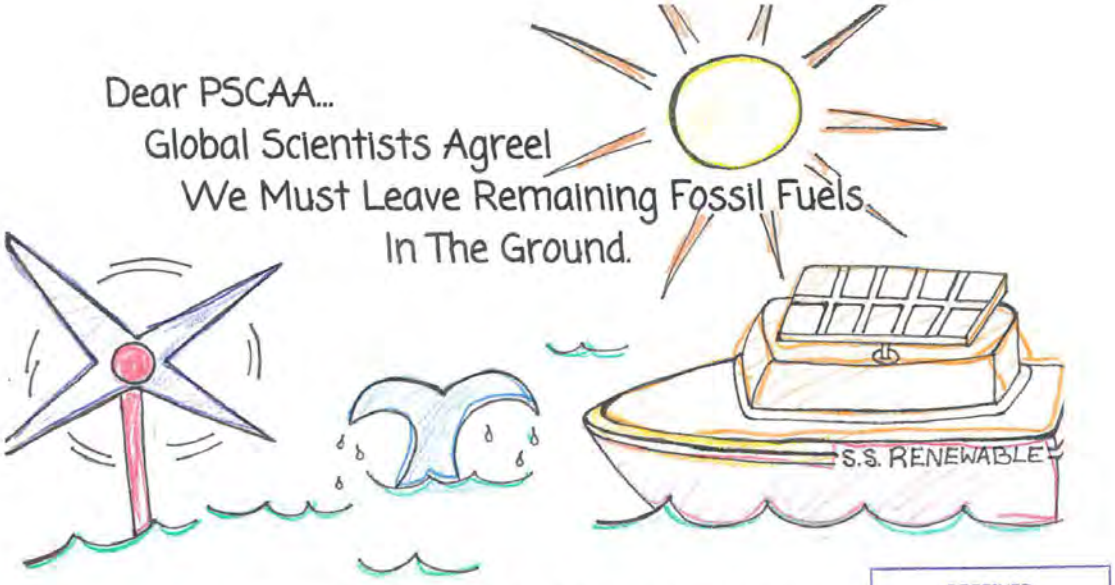
In The Ground.



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Name Ruth & Cathy Age 60 40



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Name Tia Age 9

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...

It could pollute water and air It can also hurt people by only drinking water It can pollate air to because It is acid so I could hurt people.



Name Tia Age 9

2503-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Name Winnie Age 8

Dear PSCAA,

Please Deny The Air Quality Permit For The Proposed Tacoma LNG Project Because...

if gass Lecks out Peolpe [illegible] they can get cansor and if the gass cach is on fire People can be hurt



Name Winnie Age 8

1584-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Carmela 2
To: Public Comment
Subject: LNG Public Comment letter
Date: Sunday, October 28, 2018 1:34:19 PM

Puget Sound Clean Air Agency (PSCAA)

ATTN: Public Comment on DSEIS, PSE LNG PROJECT

Hello,

My name is Carmela Micheli. I am a lifelong resident of Tacoma & Pierce County. I have owned & operated a Montessori School & Child Care in the North End of Tacoma for 41 years. My personal stake in this issue is for my students, their families, my family & all my ties to the community.

The LNG facility is dangerous & poses unacceptable risks for our environment, our health & the health of Commencement Bay & Tacoma.

The SEIS uses the GWP (global warming potential) of methane emissions for 100 years in its analysis. The world as we know it will not exist 100 years from now, we are in crisis now. The honest impacts of the whole project should be a 20year model. Because methane has a shorter life time in the atmosphere, its potency is at its highest in this time frame. The number the SEIS is using is misleading.

Global warming & climate change are real & backed by science. We must cut greenhouse gas emissions globally & locally. This project does just the opposite. We must change our mindset to clean energy projects. We must show ourselves to be an intelligent society, not one based on short term greed.

As a community & caretakers of our planet we cannot be bullied by big oil & gas companies with the constant threat of loss of jobs. We MUST invest in clean energy jobs & companies that can provide them, and we want our port to be a place for these jobs. What we should be worried about is loss of lives

which is happening now & will only get worse by turning a blind eye to the truth of how we are ruining our environment.

PSE is not telling the truth. They are giving us inaccurate & unreliable assessment of the impacts of methane & nitrous oxide as well as using a ridiculous time frame of 100 years to measure the result.

Please stop this project before we all pay too high a price.

Thank you,

Carmela Micheli

carmela@harbornet.com

(253) 851-3099

Carmela Micheli
carmela@harbornet.com

1109-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1109-2 13. LCA Inputs and Assumptions - Natural Gas Source

Carole: And Bill Adams.

Bill: Thank you for allowing me to testify today. My name is Bill Adams. I'm a member of the Salt Water Unitarian Church Climate Action team in Des Moines.

[00:26:04] If you allow this facility to go forward, you should give it a special name. You should call it the great enabler. Why that name, the great enabler? It will enable two things, both of them bad. 1) It will enable more fossil fuel extraction to support a production of 250,000 gallons, that's 33,400 cubic feet, of LNG daily. More extraction delays the transition to a clean, renewable energy economy. I'm sure you know that 97% of our world's climate scientists are in full agreement that we need to get off of fossil fuels and move to clean, renewable energy.

[00:27:12] That transition won't happen overnight, but it has to happen, if we're going to pass on a livable, sustainable planet to future generations. 2) The so-called natural gas coming from British Columbia to support this facility will be approximately 60% fracked gas. Fracking, as you know, has some very nasty side effects. Ground water contamination, excess water consumption, but worst of all, methane leakage. Methane traps has 80 times the trapping ability over a 20 year period over other fossil fuels.

[00:28:04] According to the Scientific Journal Atmospheric Chemistry and Physics, methane leakage from British Columbia gas extraction is 2.5 times more than what the province had estimated. I don't know what BC's leakage rate is, but in Montana and North Dakota, it's been documented as 10%. So, if you let this facility go forward, you're anchoring Tacoma's legacy in more fossil fuels. More fossil fuels are not going to get us to the livable planet that we can pass on to future generations. Please do the responsible thing and reject this facility. Thank you.

Carole: Thank you.

1840-1 22. General Opposition

From: Bill Adams
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 6:09:44 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG project.
I am a South King County resident concerned about climate change and what we need to do to combat global warming.
I lived in Tacoma for 13 years in the 50s and 60s and I still remember the "aroma of Tacoma". Part of what makes Tacoma so special now is its story of moving from a legacy of pollution to a community that can take pride in its cleaner industry and improved environment. This is why Tacoma should not go back to the past with another dirty fossil fuel project. Doing so will only delay the transition to a clean, renewable energy economy. If we're going to have a livable, sustainable planet to pass on to future generations we need to make that transition happen now. The longer we wait, the situation will only get worse. Tacoma can set an example for the rest of the nation to follow if they say "NO" to a facility that would only slow down the transition to fossil-free clean energy. If we and our future generations are to survive, we need to speed this transition up, not slow it down. Please say "NO" to this project. Thank you,

Bill Adams
badams6456@aol.com
23255 27th Ave. So.
Des Moines, Washington 98198

Carole: Thank you. Jori Adkins?

[01:12:00]

Jori: I'm going to just say my conclusion first.

Carole: And you are Jori Adkins, right?

Jori: Yes, I am. I'm Jori Adkins. I'm supposed to say that first. The PSCAA must require PSE to revise and update their supplemental EIS using real and relevant facts and data. And then, they need to reissue a full and complete document for public comment. And I'm saying that because of a lot of the things you've been hearing tonight, and what the fellow just before me said, so I don't need to repeat a lot of that stuff. But I do want to, after other things I've heard, I want to say a little story. And that has the fact that my husband and I live in the same zip code as the entire tide flats. It's 98421.

And we are really concerned about this plant doing in the dome district, which is an area that we have been trying, for the last 18 years, to develop as a transit oriented district, a TOD.

[01:13:09] And that's because of all of the transportation we have, they're expected to be one of the most densely populated residential areas in the city. So, people can use less cars to reduce that 43% that they're saying that we have, in the way of air pollutants because so much of it comes from cars. And so, I just wanted to say that the one thing that happened that really brings to the fore for us for air is the fact that there was a fire in September, I think it was, where it was burning the metal recycle plant out on the tide flats. And that flowed right toward the dome district and the downtown.

These are areas that we are trying to densify, so people are not having to use their cars so much. Rather than most of these people that you're hearing tonight, I believe I can say do not live in the downtown of Tacoma.

[01:14:04] This plant should not be put this close to an area that has this density and is planning on having a greater density of people. Thank you.

1559-2 3. Outside of SEIS Scope
1559-2 22. General Opposition

From: [redacted]
To: Public Comment
Subject: Draft supplemental environmental impact statement comment
Date: Thursday, November 8, 2018 9:13:45 AM

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Jori Adkins

Address or email joriadkins@mac.com

I am very concerned about the bad air of Tacoma as it is (high particulate) w/o adding more especially greenhouse gases. I live in the same zip code as the Tide flats we expect to be the densist neighborhood of the city of Tacoma we are the hive TOD Transit Oriented District, the Dome District. We have been working hard to create a neighborhood where cars (one of the most polluting factors here) are not needed. Yet here we are with a huge polluting plant coming in within blocks of us! Please do not approve this permit to add air polluting plant, when we work so hard to clean

Jori Adkins
[redacted]
253 365-1499

From: Jenn Adrien <Jenn@edbtacomapierce.org>
Sent: Wednesday, October 31, 2018 5:21 PM
To: Public Comment
Cc: Swenson, Sharmila
Subject: Public Comment on DSEIS, PSE LNG Project
Attachments: Puget Sound Clean Air Agency LNG plant JLA letter 10-30-2018.pdf

Attached please find my letter of support of the PSE LNG plant.

JENN ADRIEN
VP, Communications
edb ECONOMIC DEVELOPMENT BOARD TACOMA PIERCE COUNTY
w: 253.383.4726
d: 253.284.5888
950 Pacific Ave. Suite 410, Tacoma, WA 98402
edbTacomaPierce.org | jenn@edbtacomapierce.org

edb
ECONOMIC DEVELOPMENT BOARD TACOMA PIERCE COUNTY
950 Pacific Avenue, Suite 410
Tacoma, WA 98402
253.383.4726
edbTacomaPierce.org

October 30, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

To Whom It May Concern;

The Economic Development Board for Tacoma-Pierce County is in the business of helping companies create and retain family wage jobs for our residents. As a fifth-generation resident of the City of Tacoma, I grew up in the shadow of the ASARCO copper smelter. Tacoma's polluted past is the one in which I spent the entirety of my childhood. Thanks to a lot of hard work, Tacoma is far cleaner than the city of my parents and grandparents. The LNG facility will allow us to take it another step forward.

As much as I enjoy my work, what matters most to me is raising my son, a sixth-generation Tacoman. He is the reason I am writing to express my support for Puget Sound Energy's liquefied natural gas facility. Replacing transportation diesel fuel with clean burning LNG has strong environmental benefit. Every person in the region, people who live or work near industrial areas, and yes, my own child, will live in a healthier environment when LNG replaces diesel.

In addition to the environmental benefits of LNG, our community relies on a reliable supply of natural gas 365 days a year. Like many others, I use it to heat my home, wash my clothes, and cook food for my family. Pierce County is among the fastest growing counties in the country, and new residents add to the demand for natural gas.

The solutions to meet the future demand are pipeline expansion or storage. Natural gas storage at Tacoma LNG helps ensure that natural gas remains available all year long, for residents and businesses, even in the times when demand and usage peak, such as cold winter days.

I urge you to act promptly to complete your environmental review and issue the air permit so that this project can move forward. It's better for the environment, it's good for jobs, and it allows us to give our children a better Tacoma than the city that was passed along to us.

Sincerely,

Jennifer Adrien
Vice President for Communications
jenn@edbtacomapierce.org | 253.284.5888

1489-1 22. General Opposition

From: Anthony Albert
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:04:25 PM

Name: Anthony Albert
Email: albert2910@msn.com
Address: 285 NW 35th St - 8
Corvallis, Oregon 97330

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The draft SEIS does not account for the full climate impacts of fracked gas. The analysis is incredibly flawed and unacceptable, and we need the Air Agency to do better before they decide on the air permit for the facility.

1519-1 22. General Opposition

From: Anthony Albert
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:05 PM

Name: Anthony Albert
Email: albert2910@msn.com
Address: 285 NW 35th St -
Corvallis, Oregon 97330

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puget Sound Clean Air Agency has promised these commitments on their website: -Be good and wise stewards of the resources you give us
-Defend the future
-Prevent and reduce risk to you by upholding and enforcing the law
-Protect you from air pollution
-Tell you what's in the air you are breathing
There is no way for the Agency to uphold these commitments unless they deny the air permit for this facility.

2200-1 22. General Opposition

From: ohanka@everyactioncustom.com on behalf of Henry Albert
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 3:13:12 PM

Dear Responsible Official,

Just keep fossil fuels in the ground. We will be so much better off.

Sincerely,
Henry Albert
Elkins Park, PA 19027
ohanka@aol.com

2202-1 22. General Opposition

From: maranjam@everyactioncustom.com on behalf of Margaret Alic
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 1:23:53 PM

Dear Responsible Official,

Puget Sound Energy's proposed LNG project is a threat to Tacoma, the entire state of Washington and the entire planet. Fracked gas is as harmful to the climate as coal, and the project abridges the rights of the Puyallup Tribe. The environmental damage from this proposed facility requires that its permit be denied.

Sincerely,
Margaret Alic
Eastsound, WA 98245
maranjam@rockisland.com

1508-1 5. Regulatory Framework

From:	Pennelloppe Allee
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, November 20, 2018 8:17:52 PM

Name: Pennelloppe Allee
Email: pennelloppe99@yahoo.com
Address: 17139 SW Berkeley Ln -
Beaverton, Oregon 97003-4232

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

RE: Puget Sound Energy trying to build a Liquefied Natural Gas (LNG) refinery, storage and distribution facility in the Tideflats area of Tacoma, which is sited on Puyallup Tribal lands and is being built without their consent. It is unconscionable that indigenous people are still being ignored, dominated, and harmed by the state and by business interests.
I find it disgusting that corporations are engaging in this type of white supremacist disregard for native Americans rights even in 2018. They will bear the brunt of negative impacts, but those impacts will not be isolated to them. Everyone in the region will suffer the consequences of detrimental business endeavors.

0368-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0368-2 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Wesley Allen

Address or email wesleymallen@hotmail.com

- Please use the most-recent, evidence-based & appropriate 20-year GWP values for methane. This requires the SEIS to be upated/renewed.

- Please ~~request~~ respect the Puyallup Tribe's treaty rights.

Lastly, thank you so much for doing an SEIS. You are setting precedent for future, similar processes. Please ensure the data used is accurate & appropriate. Thanks again!

1887-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to ~~deny the permit~~ because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

- We need to use the best evidence, most recent IPCC Global Warming Potential (GWP) values for methane: 96 is the accurate 20-year GWP number!

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Wesley Allen Email:

Address: 3035 SE Antenj St, Apt 11, Portland OR 97254

By completing this comment card you agree to receive updates about the project.

1723-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 9:27:33 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracked gas is not clean. Spillage happens. Stop having the numbers counted by the wolves who profit.
If the Earth is not your mother, Are You from Mars?

Sincerely,

Margaret Almendariz
Margaret.Almendariz@yahoo.com
98038

1708-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:23:46 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Tamaryn Alvarez
omrockfane@aol.com
98516

1824-1 3. Outside of SEIS Scope

From: DREW AMDAHL
To: Public Comment
Subject: Tacoma LNG Facility Application Comments
Date: Tuesday, October 30, 2018 2:29:02 PM

I have the following comments regarding the application for a new liquefied natural gas (LNG) facility in the Tacoma Tide Flats.

1. LNG spills can unleash explosive vapor clouds. What will be the impact to the surrounding communities from this?

2. What will be the impact of a major earthquake to the LNG facility? Will there be explosive vapor clouds created? What will be the impact to surrounding communities?

3. What is the impact of a "processing vessel" (as happened at the Williams facility near the small town of Plymouth, Washington) exploding, spraying chunks of heavy shrapnel (i.e. 250 pounds as far as 300 yards) piercing the double walls of LNG tanks on site, causing leaks? What is the risk and impact to communities that vapors from the leaks could trigger a more devastating, second explosion and create a large "lethal zone" around the plant?

4. Various studies have confirmed a large amount of hazardous wastes underneath Commencement Bay (from Hooker Chemical now Occidental Chemical), including under the LNG facility. What is the risk to surrounding communities from from building an LNG facility under these hazardous wastes?

5. What are the risks and impact from an explosion from the natural gas pipelines, trucks, rail cars, and other means of providing the natural gas? What would the impact to communities be from the vapors, fires, smoke, and other things released from an accident of this nature?

6. What are the risks and impact from an explosion from the ships with the liquefied natural gas? What would the impact to communities be from the vapors, fires, smoke, and other things released from an accident of this nature?

Thank you.

Drew Amdahl

From: Amor, Dom
To: Lisa Lefeber; Public Comment
Cc: Perry, Matt; Hoffman, David
Subject: RE: Port of Everett Support
Date: Tuesday, October 30, 2018 1:55:11 AM

Thank you, Lisa! That is very, very much appreciated!

Dom Amor
Puget Sound Energy
Tribal Relations Manager
dom.amor@pse.com
(Cell) 206-604-3066

From: Lisa Lefeber [lisam@portofeverett.com]
Sent: Monday, October 29, 2018 10:32 PM
To: publiccomment@pscleanair.org
Subject: Port of Everett Support

Similar to the Ports of Seattle and Tacoma, Everett wishes to express its support for Puget Sound Energy's liquefied natural gas facility.

The Puget Sound Clean Air Agency SEIS dated October 8 concluded the environmental advantage of replacing transportation diesel fuel with clean burning LNG. We support the agency's issuance of the necessary permit(s) for the project to proceed.

Lisa Lefeber
Acting CEO/Executive Director
Lisam@portofeverett.com<mailto:Lisam@portofeverett.com>
CAUTION: This email originated from outside of the organization. Exercise extra caution when responding, opening attachments, and clicking links.

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

0749-1 22. General Opposition

Dear PSCAA

I STAND WITH PUYALLUP

Please Honor Treaty Rights.
No Permits Without Consent!

name FOR Lilith Annalee - Alaska Native age 1 yr old

1571-2 22. General Opposition
1571-2 5. Regulatory Framework

From: Glen Anderson
To: Public Comment
Subject: I STRONGLY OPPOSE PSE"s LNG Project!
Date: Monday, November 12, 2018 7:55:24 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for letting the public speak. Democracy needs such opportunities.

I STRONGLY OPPOSE PSE's Liquefied Natural Gas project in Tacoma.

It is a HORRIBLE idea in many ways!

Your agency -- PSCAA -- should be PROTECTING AIR QUALITY, but the LNG project would hurt air quality.

The world's top climate scientists express ALARM at the rapidly worsening climate crisis, and they URGE VERY STRONG IMMEDIATE ACTIONS to reduce the use of fossil fuels. That includes LNG.

THE WHOLE WORLD IS IN SERIOUS DANGER, so I implore you to REJECT PSE's LNG project!!!!!!

Local water, public health, and other factors are seriously at risk.

The Puyallup Tribe -- a sovereign nation -- strongly opposes this project.

In any case, this draft SEIS is not complete. Other people who are familiar with the scientific and procedural matters are telling you about those fatal flaws.

MY MOST SERIOUS CONCERN IS AT THE LARGER LEVEL about the damage to the local environment and public health and the whole world's climate.

PSE's LNG project is suicidal for planet earth.

I IMPLORE you to PROTECT AIR QUALITY.

I IMPLORE you to PROTECT EARTH'S CLIMATE.

Thank you.

Glen Anderson
glenanderson@integra.net
5015 15th Ave SE
Lacey, Washington 98503

1572-1 22. General Opposition

From: glenanderson@everyactioncustom.com on behalf of Glen Anderson
To: Public Comment
Subject: I STRONGLY OPPOSE Tacoma LNG. Here"s my SEIS Project Comment
Date: Saturday, October 27, 2018 2:32:09 PM

Dear Responsible Official,

I STRONGLY OPPOSE the PSE LNG project.

It would HURT AIR AND WATER AND PUBLIC HEALTH AND ENVIRONMENT AND CLIMATE.

The world must RAPIDLY TRANSITION AWAY from fossil fuels. PSE's LNG project would trap us into fossil fuels for many decades.

Fracked natural gas is part of the problem, not the solution.

I IMPLORE YOU TO PROTECT A LIVABLE CLIMATE and STOP the project!!!!!

Sincerely,
Glen Anderson
Lacey, WA 98503
glenanderson@integra.net

1645-1 22. General Opposition

From: Glen Anderson
To: Public Comment
Subject: Public Comment on DSEIS; OPPOSE PSE"s HORRIBLE LNG Project!
Date: Wednesday, October 31, 2018 3:28:17 PM

Glen Anderson
5015 15th Ave SE
Lacey, WA 98503-2723

October 31, 2018

Dear Carole J. Cenci,

Nowadays EVERYBODY except people tainted by corruption knows that FOSSIL FUELS MUST STAY IN THE GROUND if we want planet earth to survive!!!!!

The world's top climate scientists have told us over and over again -- with INCREASING FRUSTRATION AND URGENCY -- that earth's climate is TIPPING OVER INTO FEEDBACK LOOPS WITH HORRIBLE CONSEQUENCES. I implore you to read the IPCC's reports and/or articles about those authoritative reports.

The proposed LNG project would HURT TACOMA, its PEOPLE, its PUBLIC HEALTH, its ENVIRONMENT, and PLANET EARTH!!!!!

FRACKED "natural" gas it NOT "natural" at all. The fracking process RELEASES HUGE AMOUNS OF METHANE, which is FAR, FAR WORSE than carbon dioxide.

Thanks for deciding to analyze the lifecycle of the greenhouse impacts of this project and the related kinds of rigorous analysis.

THE FUTURE IS A LONG, LONG TIME!!!!!
Your decisions today will ABSOLUTELY DETERMINE the dangers for our future.

Sincerely,
Glen Anderson

1664-1 22. General Opposition

From: Glen Anderson
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, October 24, 2018 2:32:54 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I am APPALLED that PSE's Liquefied Natural Gas project might get built in Tacoma.

PLEASE DENY THE PERMIT!!!!!!!!!!!!!!!!!!!!

I IMPLORE YOU TO PROTECT THE AIR QUALITY from this nasty pollution!!!

I IMPLORE YOU TO PROTECT THE CLIMATE from the greenhouse gases related to fracking natural gas!!!

I IMPLORE YOU TO PROTECT PUBLIC HEALTH from this grossly irresponsible pollution source.

The LNG facility would lock us into decades of fracked gas, toxic pollution, and extreme safety risks for local residents.

Don't you know THE WORLD'S CLIMATE SCIENTISTS ARE UNANIMOUS THAT WE MUST STOP THIS KIND OF STUPIDITY AND SUICIDE???????????????

PLEASE DENY THE PERMIT!!!!!!!!!!!!!!!!!!!!!!

Glen Anderson
glenanderson@integra.net
5015 15th Ave SE
Lacey, Washington 98503

1987-1 23. General Support

From: Karl Anderson
To: Public Comment
Subject: PSE Tacoma LNG Facility
Date: Tuesday, October 30, 2018 12:51:48 PM

Dear Puget Sound Clean Air Agency,

I am requesting that you move forward and grant the Air Quality Permit for the PSE Tacoma LNG facility.
I believe that converting ships, trucks, and other diesel-powered equipment to LNG will significantly reduce emissions and improve air quality in the Tacoma Tideflats and surrounding areas.
My business is located less than half a mile from the new PSE LNG facility, and I have absolutely no qualms about the safety of this facility, and wholeheartedly support its completion.

Sincerely,

Karl Anderson
Concrete Technology Corporation

1197-1 22. General Opposition

Carole: Thank you. Our next group of five is Neal Anderson, Dominic Petoud, Andrea Scott-Murray, Jenn Adrien, and Terry Sullivan. And Neal Anderson is first.

Neal: Other people here have argued that the methane leaks a lot more than the SEIS claims. And they're right. The best science and all of the field measurements back that up. But let's pretend that the claim is true. That Canada has some magic fracking process that doesn't leak methane and that they have perfect seals o all of their pipelines.

[00:54:02] If methane weren't a factor, then, it's true that natural gas would be a lot less harmful to the climate than the bunker fuel it's replacing. If you could eliminate all methane emissions from the entire process, it would only have about half as much global warming impact as other fossil fuels. But even if that were possible, at this point, it's too late for half measures. The UN report that just came out said that, if we start working towards a goal of zero emissions right now, in every sector, it still won't be enough to keep us below two degrees. Even then, we have to hope we can find a way to remove a lot of the CO_2 that's already in the air.

All of our energy investment, right now, needs to be in carbon free sources. This $310 million could buy hundreds of megawatts of clean energy rather than a dirty LNG plant, which is a lateral move at best. You have an obligation to protect the air and to acknowledge that it's already dangerously over polluted with greenhouse gases and that it's now an impending health crisis. Don't issue a permit to an energy company that's trying to lock us deeper into fossil fuels.

[00:55:00] And if I can add one other thing. The gentleman before had said that we need this LNG plant for reliability, as evidenced by the recent pipeline explosion in BC. I would instead take that as a reason not to keep building up more fracked gas infrastructure. Thank you.

lear Port of Kalama, and Cowlitz County,
lear Puget Sound Clean Air Agency,

2071-1 22. General Opposition

I am concerned about the proposal to construct additional fossil fuel infrastructure at a time when the climate crisis requires that we move to clean energy as soon as possible. Let the ships burn low-sulfur diesel for now and take that money for investment is truly sustainable solutions.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Neal Anderson	Email: sagen2112@yahoo.com
Address: 1855 Tressady ~~Blvd~~ Blvd SE Issaquah, WA 98075	Phone: 206-794-2053

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2079-1 3. Outside of SEIS Scope

I am concerned with the amount of water required for the fracking that will supply the gas. If this is taken from aquifer's that are already under stress, this could impact communities who depend on it. Given that climate change is expected to cause droughts in many places, this is not a responsible use for our precious water.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Neal Anderson	**Email:** sagan2112@yahoo.com
Address: 1855 Trossachs Blvd SE	**Phone:** 206-794-2053

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2087-1 3. Outside of SEIS Scope

I am concerned that the Puyallup Tribe is bearing the brunt of the impacts from this project. Contaminated silt was dredged onto their shore to create the land where the tank is being built. Their children will be breathing the pollution from the plant's operation, and if there's a serious incident (earthquake, lahar, flood...), they'll be in the danger zone.

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Neal Anderson
Email: sagan2112@yahoo.com
Address: 1855 Trossachs Blvd SE
Phone: 206-794-2053

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2088-1 3. Outside of SEIS Scope

I am concerned about the chemicals used in the fracking process that can be released into aquifers in the case of a surface spill. Industry tried to keep these secret for a long time but now that we're starting to find out what they are many are extremely hazardous and some are carcinogenic

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Neal Anderson	Email:
Address: 1855 Trossachs Blvd SE	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2089-1 14. LCA Inputs and Assumptions - Leakage/Slippage

I am concerned that the methane leak rate from fracking hasn't been adequately quantified. The drilling and flow back phases have been shown to leak copious methane from atmospheric measurements. This needs to be accurately estimated to give a full lifecycle global warming potential.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Neal Anderson	Email: sagan2112@yahoo.com
Address: 1855 Trossachs Blvd SE #601	Phone: 206-794-2053

1616-1 5. Regulatory Framework
1616-2 3. Outside of SEIS Scope

From: Mary Ann
To: Public Comment
Subject: pollution
Date: Tuesday, November 6, 2018 10:31:00 AM

I am a member of the LWV-SC Natural Resources/Sustainable Agriculture Committee.
The proposed Tacoma LNG project violates Puyallup treaty rights and would lock us into decades of continued fossil fuel dependence. This LNG facility will cause health issues at British Columbia extraction sites, as well as from toxic facility emissions here in our local Salish Sea region. It poses a physical threat to thousands in the event of an accident or natural disaster, with a huge chunk of the bill being paid for by residential PSE customers even though the main stated purpose of the project is fueling commercial vessels. As a tax payer, senior citizen, voter, and member of the League I find the proposal for this project offensive to the citizens of WA and BC. Please end the progress of this project.
Mary Ann Smith

1607-1 22. General Opposition

From: Sean Arent
To: Public Comment
Subject: On PSE"s LNG Tank
Date: Sunday, November 18, 2018 2:21:45 AM

As someone who works at a nearby terminal, it's pretty obvious to me that this a step in the wrong direction. Pollution is pollution, and this tank will prolong fossil fuel use in the tideflats area. Natural gas from the process of fracking leaks methane, a far more potent pollutant than carbon dioxide. As a young person, I will have to live with the consequences of continued fossil fuel use, and would like to see this facility closed down.

1671-1 10. LCA Calculations
1671-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1671-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1671-4 5. Regulatory Framework

From: Judy Arielle Fiestal
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 11:32:16 PM

Puget Sound Clean Air Agency,

Greetings! I am writing to urge this council NOT to approve the building of the LNG Project in Tacoma. Our planet is in a perilous state due to climate change. Investments now need to be made in the renewable energy sector and not continue down this dinosaur aged exploitation of fossil fuels to address our energy needs. We need civic leadership in this realm to prevent our environment continued degradation.

In addition there are several grounds that this project should not be approved. The SEIS appears to be incomplete. There are areas that should contain values that are blank. For this reason alone the SEIS should be completed and then resubmitted - extending the deadline for public comments to respond to the completed report.

The SEIS is using methane global warming potential banks that is outdated. Also values are being presented that do not coincide with the amount of years this plant would be in operation.

The report inaccurately reports the likely leakage that will be evidenced by this pipeline - not including data from the past 2 years in determining the amount concluding the leakage will be much less than what many experts predict.

The pipeline will need to be built through the Puyallup trial lands. The tribe does not approve having this pipeline on their territory.

For these reasons and many more, I urge that the Puget Sound LNG project not be approved.

Judy Arielle Fiestal

Judy Arielle Fiestal
judyarielle@gmail.com
3587 SE Grant Street
Portland, Oregon 97214

1372-1 22. General Opposition

From: Daniel Armstrong
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:43:33 AM

Name: Daniel Armstrong
Email: lumpycub@gmail.com
Address: 3990 se Johnsoncreek Blvd., -
Milwaukie, Oregon 97222

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please no fracking. The time is now to resist all fossil fuels.

Carole: Thank you. Oneida Arnold?

Oneida: Good afternoon. My name is Oneida Arnold. I'm a citizen of Tacoma. And I'm deeply concerned on so many levels about the flawed inaccurate SEIS that the Puget Sound Clean Air Agency has presented. And I request that you reissue another SEIS that has current and accurate data of the full impacts of fracked gas.

[01:43:00] First and foremost, we stand on Puyallup land. The proposed LNG project is a direct afront to the Puyallup Tribe. The city of Tacoma failed to fulfil its legal responsibility to meaningfully consult the Puyallup Tribe throughout the process putting their treaty rights, resources, and community at risk. I stand with the Puyallup Tribe in opposition to the LNG facility. I retired last year from teaching at McCarver Elementary school. McCarver is located in Hilltop, an under resourced community. My students and their families already suffer disproportionately from poor air quality drifting up from the fossil fuel industries on the tide flats.

The volatile organic compounds that the LNG facility would release have severe health consequences that have not been included in the SEIS.

[01:44:00] The United Nations Intergovernmental Panel on Climate Change, IPCC, which has been mentioned, has just released a comprehensive report warning that we must change our fuel mix away from fossil fuels in the next 12 years or face dire consequences. The PSCAA use already outdated methodology in calculating the greenhouse gas emissions and 100 year values rather than 20 year values. Please change your scenario to reflect an accurate representation of the impact on air quality and global warming. Again, the draft SEIS from PSCAA is very flawed, and I stand in opposition to this LNG project. Thank you.

1200

1200-1 5. Regulatory Framework
1200-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

1768-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:19:31 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

NO fracking in WA !! Or in the United States!!! Stop all fracking! Next time there is a new utility to take over from PSE I guess I'll have to go with it. I didn't know PSE was doing that!

Sincerely,

Amy Aspell
aspella@comcast.net
98110

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

Fracking contaminates huge volumes of water, with known carcinogens

There are fracking-related air pollutants in the transport of fracked gas

Methane is 84x more potent a greenhouse gas than CO_2

I am concerned with increased pollution of water and air from these facilities and the transport of fracked materials relative to communities upwind and downwind from the facilities themselves

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ady	Email: elizabeth.ady@gmail.com
Address: 1660 12th Av, #403, Seattle	Phone: 541-272-2123

Gein.

0567

0567-3 22. General Opposition
0567-3 3. Outside of SEIS Scope
0567-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

0568-1 22. General Opposition

Transport of methanol entails risks in addition to those of fracking itself.
We risk the health of our communities for the profit of big oil companies.

It is way past time for us to invest time, energy and resources into the development of clean energy sources such as solar and wind and hydraulic energy

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ably	Email: elizabeth.ably@gmail.com
Address: 1660 12th Ave. #417 Seattle, WA 98122	Phone: 541-272-2103

0569-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned by the risks of pipelines through indigenous communities and close to water sources. It seems that spills and explosions are inevitable.

The SEIS must include the impacts of methane leakage both at extraction sites and pipeline locations

There are social, health, and environmental impacts to consider

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ally	Email: elizabethally@gmail.com
Address: 1660 12th Ave, #417, Seattle 98122	Phone: 541.272.2123

0570-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

These operations are devastating to our water sources, to the salmon and orcas and ~~other~~ other marine life of the Salish Sea, not to mention pollution of drinking water for human population, especially of communities close to the facilities, which are often low income / indigenous communities.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Athy	Email: elizabeth.athy@gmail.com
Address: 1660 12th Ave #417,	Phone: 541-272-2198

0571-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

Rather than displacing dirtier fuels, these projects will only add to fossil fuel use. It is past time to be done with fossil fuels, when alternative, replaceable energy are economical & will create more permanent jobs etc

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ady	Email: elizabeth.ady@gmail.com
Address: 1660 12th Av, #417 Seattle 98122	Phone: 541-272-3123

2029-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Rather than displacing dirtier fuels, these projects will only add to fossil fuel use. It is past time to be done with fossil fuels, when alternative, replaceable energy are economical & will create more permanent jobs etc

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ally	Email: elizabeth.ally@gmail.com
Address: 1660 12th Av. #417 Seattle 98122	Phone: 541-272-3123

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

There operations are devastating to our water sources, to the salmon and orcas and ~~other~~ other marine life of the Salish Sea, not to mention pollution of drinking water for human population, especially of communities close to the facilities, which are often low income / indigenous communities.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Athy	Email: elizabeth.athy@gmail.com
Address: 1660 NE Ave #417, Seattle WA 98125	Phone: 541-272-2128

2036-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned by the risks of pipelines through indigenous communities and close to water sources. It seems that spills as well explosions are inevitable.
The SEIS must include the impacts of methane leakage both at extraction sites and pipeline locations
There are social, health, and environmental impacts to consider

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ally	Email: elizabethally@gmail.com
Address: 1660 12th Ave #417, Seattle 98122	Phone: 541-272-2173

2039-1 3. Outside of SEIS Scope
2039-2 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2043-1 3. Outside of SEIS Scope

Transport of methanol entails risks in addition to those of fracking itself.
We risk the health of our communities for the profit of big oil companies.

It is way past time for us to invest time, energy and resources into the development of clean energy sources such as solar and wind and hydraulic energy

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ally	Email: elizabeth.ally@gmail.com
Address: 1660 12th Ave. #417 Seattle, WA 98122	Phone: 541-272-2123

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Fracking contaminates huge volumes of water, with known carcinogens

There are fracking-related air pollutants in the transport of fracked gas

Methane is 84x more potent a greenhouse gas than CO_2

I am concerned with increased pollution of water and air from these facilities and the trasport of fracked materials relative to communities upwind and downwind from the facilities themselves

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Elizabeth Ashley	Email: elizabeth.ashly@gmail.com
Address: 1660 12th Ave, #401, Seattle 98122	Phone: 541-272-2128

2045-2 3. Outside of SEIS Scope
2045-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

1546-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1546-2 13. LCA Inputs and Assumptions - Natural Gas Source
1546-3 7. SEPA Alternatives
1546-4 5. Regulatory Framework

From: Sean Augustino
To: Public Comment
Subject: Comment on SEIS for PSE LNG Plant
Date: Wednesday, November 21, 2018 6:45:30 PM

Dear Puget Sound Clean Energy Agency,

As a Puget Sound resident and PSE customer, I want to voice my opposition to the clean air permit for PSE's proposed Tacoma Tideflats LNG facility. Firstly, I find the analysis problematic for multiple reasons. It does not appear to adequately account for the higher initial impact of methane over the first several years after emission, assumes all supply from BC, which under circumstances like those currently could be infeasible, and assumes under the no action alternative no push for cleaner fuels. As a recent volunteer for both I-1631 and I-732, I believe this state needs to not merely reduce fossil emissions, but actively turn away from new fossil infrastructure and push for renewable fuel technologies as fast as they become viable. We must do this if we are to have any hope of meeting our Paris climate goals.

Secondly, the speed and opacity of this project concern me. Lack of consultation with local tribal leaders, major public safety concerns, and construction prior to permitting all make me worried about the safety, and integrity of the facility into the future, and do not inspire confidence in PSE's concern for public welfare around the project.

I believe if the Agency wants clean air and public health as priorities in our region, it should reject this permit, and allow local leaders to develop the tideflats in a way that better serve the climate and the public. Thank you.

Sincerely,
Sean Augustino
Seattle, WA

--
Sean Augustino
Cornell University
B.S. Civil Engineering, 2012
M.Eng. Structural Engineering, 2013
sca48@cornell.edu
www.linkedin.com/pub/sean-augustino/42/4aa/2a3

1869-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

1. Using the 100-year Global Warming Potential (GWP) gives a falsely low estimate of the impact of the involved methane emissions. A better estimate comes by using the 20-year GWP figures.

2. There seems to be no way to verify the claim that BC fracked gas is as clean as it comes. NO FRACKED GAS IS CLEAN!

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Deborah Avenll Email: debbie2017@edavenll.com

Address: 8815 SW Oxbow Terrace, Beaverton, OR 97008-6903

By completing this comment card you agree to receive updates about the project.

1870-1 22. General Opposition

Name _____

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you ~~to deny the permit~~ because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

1) "Natural" gas is not a bridge fuel as it has been described. It in fact is generally seen as a bridge to methane (which itself is significantly worse than CO_2 with regard to damage to the environment).
2) Given the recent report from the United Nations, we have about 12 years to save the planet we need not to encourage ~~any~~ additional use of petroleum-based products.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Deborah Averill Email: debbie2017@edaverill.com
Address: 8875 SW Oxbow Terrace, Beaverton, OR 97008

By completing this comment card you agree to receive updates about the project.

1871-1 5. Regulatory Framework

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The proposed project does not recognize the treaty with the ~~Pull~~ Puyallup ~~Tribe~~ Tribe. The Medicine Creek Treaty is the supreme law of the land; it has been violated during the vetting process for this LNG facility. The Puget Sound Clean Air Agency (and all others) still need to consult with the Puyallup Tribe.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Deborah Averill Email: debbie2017@edaverill.com.

Address: 8875 SW Oxbow Terrace, Beaverton, OR 97008-6903

By completing this comment card you agree to receive updates about the project.

1867-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Fracked gas is leaked at rates that make it a dirtier fuel than coal. It is inexcusable to use it as a "clean fuel".

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Ed Averill Email: eda@acm.org

Address: 8815 sw oxbow Ter, Beaverton, OR 97008

By completing this comment card you agree to receive updates about the project.

1868-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Norway is providing similar near-port clean transport with electrified barges and tug boats. That is far cleaner than fracked gas.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Ed Averill Email: eda@acm.org
Address: 8815 SW Oxbow Ter, Beaverton OR 97008

By completing this comment card you agree to receive updates about the project.

2542-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2542-2 14. LCA Inputs and Assumptions - Leakage/Slippage
2542-3 7. SEPA Alternatives
2542-4 7. SEPA Alternatives
2542-5 3. Outside of SEIS Scope

From: peter_yrs@everyactioncustom.com on behalf of Peter Ayres
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 10:55:55 AM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

6. I am also concerned with just how much water it's going to be take to run this operation. Water is becoming a serious commodity whether we admit it or not. Where will the supply come from and how many gallons per day will be wasted on this project. The impact of water use on the local area really need to be a concern.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Peter Ayres
Naperville, IL 60563
peter_yrs@yahoo.com

1990-1 23. General Support

From: Mariana B
To: Public Comment
Cc: tim@thompsoncg.com
Subject: Public Comment
Date: Wednesday, November 21, 2018 12:38:09 PM
Attachments: Public Comment 11.21.2018.pdf

Please find attached my public comment. Thank you.

Best,
Mariana Becerril

November 20, 2018

To Whom It May Concern:

I worry that in today's society we tend to yell at each other and we have leaders who seek to divide us as opposed to bringing us together. From the outset, let me state that I respect those who oppose this LNG Facility and I can understand some of the concerns expressed. However, I support the LNG Facility and I support TOTE's decision to convert its ORCA fleet to LNG.

I come to this conclusion, because I see LNG as a less polluting fuel source for TOTE's Fleet that will actually reduce greenhouse gases. Many areas of the world are moving to LNG and the Port of Tacoma needs to invest in the future of cleaner burning fuels to stay competitive in the world trade market. Think of the worldwide environmental benefit if Ports around the world all convert to LNG instead of diesel fuel.

In the final analysis, we all breathe the same air. Saying no to LNG does not make environmental sense because as the SEIS says, the alternative is to use more polluting petroleum-based fuels.

For me the choice is simple. We are all facing the impacts of climate change and we all need to do our part to reduce our carbon footprint. TOTE's conversion to LNG allows us to build a cleaner maritime fleet that will benefit the Washington, Canada, and the Alaska coast.

While LNG is not perfect, it would be irresponsible stewardship if we did not approve this project. I urge the Air Agency to approve this air permit. We have a chance to do something good for the environment by approving this project and following science for a change.

Sincerely,

M. Bn

Mariana Becerril

1991-1 23. General Support

From:	Mariana B
To:	Public Comment
Cc:	tim@thompsoncg.com
Subject:	Public Comment
Date:	Wednesday, November 21, 2018 12:27:22 PM
Attachments:	Public Comment 11-21-2018.pdf

Please find attached my public comment. Thank you.

Best,
Mariana

November 20, 2018

To Whom It May Concern:

I worry that in today's society we tend to yell at each other and we have leaders who seek to divide us as opposed to bringing us together. From the outset, let me state that I respect those who oppose this LNG Facility and I can understand some of the concerns expressed. However, I support the LNG Facility and I support TOTE's decision to convert its ORCA fleet to LNG.

I come to this conclusion, because I see LNG as a less polluting fuel source for TOTE's Fleet that will actually reduce greenhouse gases. Many areas of the world are moving to LNG and the Port of Tacoma needs to invest in the future of cleaner burning fuels to stay competitive in the world trade market. Think of the worldwide environmental benefit if Ports around the world all convert to LNG instead of diesel fuel.

In the final analysis, we all breathe the same air. Saying no to LNG does not make environmental sense because as the SEIS says, the alternative is to use more polluting petroleum-based fuels.

For me the choice is simple. We are all facing the impacts of climate change and we all need to do our part to reduce our carbon footprint. TOTE's conversion to LNG allows us to build a cleaner maritime fleet that will benefit the Washington, Canada, and the Alaska coast.

While LNG is not perfect, it would be irresponsible stewardship if we did not approve this project. I urge the Air Agency to approve this air permit. We have a chance to do something good for the environment by approving this project and following science for a change.

Sincerely,

M. B

Mariana

Steve: Thank you. Marianna B?

[05:46:00]

Marianna: Hi. Thank you for the opportunity to speak to you this evening as a citizen. I worry that, in today's society, we tend to yell at each other, and we have leaders who seek to divide us, as opposed to bringing us together. From the outset, let me state that I respect those who oppose the LNG facility, and I can totally understand the concerns expressed. However, I do support the LNG facility, and I do support TOTE's decision to convert it's Orca fleet to LNG. I come to this conclusion because I see LNG as a less polluting fuel source for TOTE's fleet that will actually reduce greenhouse gases.

Many areas of the world are moving to LNG and the Port of Tacoma needs to invest, in the future of cleaner burning fuels to stay competitive in the world trade market.

[05:47:00] Think of the worldwide environmental benefit, if ports around the world were all to convert to LNG, instead of diesel fuel. In the final analysis, we do all breathe the same air. Saying not to LNG does not make environmental sense because, as the SEIS says, the alternative is to use more polluting petroleum based fuels. For me, the choice is clear and simple. We're all facing the impacts of climate change, and we all need to do our part to reduce our carbon footprint. TOTE's conversion to LNG does allow us to build a cleaner maritime fleet that will benefit the Washington, Canada, and Alaska coast.

While LNG is not perfect, who is, it would be irresponsible stewardship, if we did not approve this project. I urge the Air Agency to approve this air permit. We do have a chance to do something good for the environment, by approving this project and following science, for a change. Thank you.

2239-1 10. LCA Calculations
2239-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2239-3 10. LCA Calculations
2239-4 13. LCA Inputs and Assumptions - Natural Gas Source
2239-5 11. LCA Inputs and Assumptions - General

From: Chrystal Baird
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Tuesday, November 20, 2018 5:38:43 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

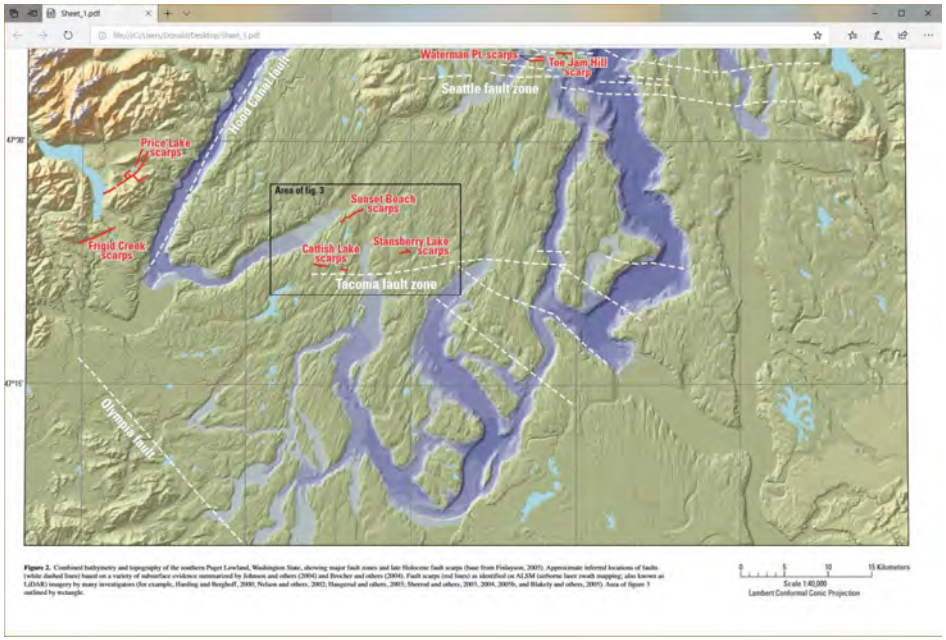
Chrystal Baird
chrysbaird@msn.com
627 7th St SE
Auburn , Washington 98002

1310-1 3. Outside of SEIS Scope
1310-2 3. Outside of SEIS Scope
1310-3 3. Outside of SEIS Scope
1310-4 3. Outside of SEIS Scope

From: Donald Ballantyne
To: Public Comment
Cc: Don Ballantyne
Subject: Earthquake Vulnerability of the LNG Facility
Date: Thursday, November 1, 2018 3:11:40 PM
Attachments: image.png

I am registered civil engineer in Washington residing in Dash Point. My area of expertise is earthquake engineering associated with buried utilities. I have worked for every major water utility along the west coast including Metro Vancouver BC, Seattle, Tacoma, Portland, San Francisco, Los Angeles, and San Diego.

My concern about the LNG facility is the vulnerability to the rupture of the Tacoma Fault. The Tacoma Fault, as mapped by the US Geological Survey, originates in the area just east of the tip of the Hood Canal, and runs easterly, splitting into three strands. The middle strand runs through the tide flats in Tacoma (see the figure below).



The fault has a relatively long recurrence interval, on the order of 6,000 years, which puts it beyond the envelope of normal planning as addressed in ASCE 7 and the International Building Code (IBC). However, it is standard practice in the United States to design high risk facilities to more stringent requirements. For example, dams are designed for a 10,000 year return earthquake when being subjected to a 10,000 year storm. Nuclear power plants are designed to one in one million probability hazards. These low probability high risk hazards events can not only result in extreme damage to the facility itself (such as a building collapse) but to the surrounding population. As such, I strongly believe that the LNG facility and all connecting piping should be designed to safely stop operation and retain all natural gas, in both liquid and gas form, for an earthquake event with a 10,000-year return period, including a event on the middle strand of the Tacoma Fault.

There are three very significant hazards that can result from an earthquake on the Tacoma Fault: ground shaking, fault displacement, and liquefaction and associated lateral spread. Ground shaking is likely to be very strong - the LNG plant and connecting pipelines, both supply and ship loading, should be designed to accommodate this shaking intensity. Of greater concern is fault displacement and liquefaction/lateral spreading. The above map shows the Tacoma Fault middle strand to be to the southwest of the LNG facility. However, there is little detailed information known about the exact location where faulting would occur. The fault movement would initiate 6 to 10 miles deep and could propagate to the surface at an angle resulting in surface faulting through the LNG facility and the connecting pipelines. The offset could be as much as tens of feet, (Seattle Fault offset of 22 feet in 900 AD event). Such an offset could result in heavy damage to the LNG facility/tank, and would be likely to shear off the connecting pipelines. There is no proven design of buried pipelines of any type to cross a fault rupture displacement of that magnitude. The entire tide flat area is highly vulnerable to liquefaction. When soil liquefies, it will "flow" towards a free face such as the bank of the Hylebos Waterway or the NW face of the tide flats facing Commencement Bay. Displacements can be may 10s of feet. Historically, steel pipelines buried in soils undergoing such displacements are heavily damaged, with the pipe barrels cracking, and welds failing, rapidly releasing the pipeline's contents. Severe liquefaction and lateral spreading is not only expected in a Tacoma Fault event on the middle strand, but with movement on any of the fault strands. In addition, severe liquefaction and lateral spreading is expected in the tide flats in earthquake events that occur on a much more regular basis such as the Cascadia Subduction Earthquake.

I strongly believe that if the regional decision makers want to approve construction and operation of the proposed LNG facility, they must

1310-4 cont'd 3. Outside of SEIS Scope

require the owner to design the LNG facility/tank and all connecting piping to withstand the earthquake hazards discussed herein. Anything short of that could result in loss of life and extensive damage.

Don Ballantyne
1915 63rd St. NE
Tacoma, WA 98422
206-226-7496

Steve: Thank you. Next up, Stephanie Barbee.

Stephanie: Hi. My name is Stephanie Barbee.

[06:23:00] I'm not sure what I'm going to say actually. Thank you for being here. It's been a long night. So, I'm from Vashon Island. And I want to say that Asarco mess is not cleaned up. I know it because – let me back up for a second and say I stand with the Puyallup People. And it's awkward because I live on land that's their land. And it's polluted. When we bought it, we had it tested. And it has elevated levels of lead and arsenic. It's beautiful woods. We have owls and frogs and deer. And it's not in such great shape. So, if you come to Vashon, it's quite beautiful.

Some of our traditions are, probably if you visit someone there, you'll take your shoes off at the house, and you'll leave them by the front door, so you don't track in the lead and arsenic.

[06:24:00] If you have small children playing there, or if you're a gardener, you will wash your hands immediately, after being in the soil. And if your child drops their Fig Newton on the playground or on your land, you might not do the three second rule. You might just say we'll just put it in the compost. I mention it because that problem started from air pollution that drifted across the Sound to our island to West Seattle, other parts of Tacoma. And the pollution is still there. And I'm concerned about hits LNG because it's not so easy to just wipe off your boots.

And you can't just recycle the Fig Newton, when it drops on the ground. It goes into the air. And it changes the climate. And it's also poisonous. It's also toxic just as is. And I want to believe that the people of TOTE Marine have good intentions. I feel that there's passion, when they speak about the environment. I feel like that's legitimate. I also think they started making plans to go to LNG, no thanks to PSE who is in the fossil fuel business.

[06:25:02] They made those plans during the Obama Administration. I have to check my facts. I'm guessing about this. But I know that administration was pro natural gas back then because we thought it was the good transition fuel. Turns out, now that we know about methane leaks, it is no longer the darling transition fuel. And now that we have the IPCC report out, we need to think fast about what we're going to do. So, I don't envy you guys at all. It's a giant task you have. You have all of those permits that have been gathered from the other agencies. And there is this permit left and maybe

another one.
And we can see they're already starting to transition their ships to take LNG before they even have the permits. It's kind of arrogant. I'll be thinking about you guys, as you make your decision. It's a big one. No one is going to be happy. Someone is going to be unhappy. If you're not sure what to do, maybe you can delay the process and have a fact finding process, so we can at least agree on the facts because, clearly, we don't.

[06:26:03] Thank you.

1649-1 5. Regulatory Framework

From: Stephanie Barbee
To: Carole Cenci
Subject: public comments on proposed LNG storage
Date: Friday, November 9, 2018 9:59:47 AM

Dear Carole,

I am looking through your website and cannot locate where public comments are available for review, either written or oral. I think it is important not only to be invited to submit them but also to see what other community members have to say.

Please advise.

Thank you!

Stephanie Barbee
Vashon Island

2196-1 3. Outside of SEIS Scope

From: hayleybarcia@everyactioncustom.com on behalf of Hayley Barcia
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Monday, October 22, 2018 10:01:54 AM

Dear Responsible Official,

I dont agree with fracking. It is all of our earth and I think it is wrong that just because a company has money they should be allowed to destroy it for all of us (animals, plants, ecosystems and humans!)!

Sincerely,
Hayley Barcia
San Francisco, CA 94121
hayleybarcia@gmail.com

Carole: Thank you. Charles Barnhart?

Charles: Hi.

[02:44:00] I'm Charles Barnhart. I have a PhD in physics. I'm an expert in energy analysis and lifecycle assessment, as evident by my post-doctoral fellowship at Stanford University and my present professorship at Western Washington University. I'm here to comment on the inadequacies of the DSEIS on behalf of myself using my own time and not on behalf of the aforementioned university of higher learning. Many of the points have already been brought up by previous commenters. The leakage rates are woefully inadequate.

The report uses black box, opaque calculations with units that are difficult to parse. They report leakages in grams per mega BTUs. It's difficult to back cast that into production leakage rates. I did my best. I got a value of 0.9%. The best practice in academia today is this report in the *Journal of Science* that came out in June 2018.

[02:45:03] Alvarez et al, the et al constitutes 24 other authors from prestigious areas of higher learning. And they identify a rate of 2.3% to 2.7%. This would put the climate impact of this project at par with coal, not with natural gas. Secondly, the report used out of date global warming potentials, as mentioned earlier, and inappropriate resonance atmospheric timeframes for methane. The no action alternative fails to consider shipping growth rates. And, among other reasons, is a false equivalence.

In conclusion, the draft Supplemental Environmental Impact Statement, while an admirable draft submission, and I certainly recognize the amount of work that went into it, is incomplete and uses outdated science. It simply would not pass peer review in academic journals. I review at least two journal articles a month.

[02:46:00] And, in closing, I'd like to mention that the natural gas was a bridge to renewable future 10 years ago. The bridge has been built. We can cross it, if we want to. I think it's pathological to walk and pace back and forth on the bridge rather than crossing to the greener present that's on the other side.

Carole: Thank you. So, this next group will be the last group that will have the opportunity to speak, during this afternoon's session. So, we still have quite a few that had signed up this session. So, if you still want to speak, you'll need to come back at 6:30. And you'll be

1122-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1122-2 3. Outside of SEIS Scope

first in line there. Or, of course, we can always take your comments in writing as well. So, the next group is Alex Ramel, Cecile Gernez, Cathy Carruthers, Lloyd Madden, and Diane Martin.

2231-1 22. General Opposition
2231-2 10. LCA Calculations

From: Katharine Barrett
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 9:43:13 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. Scientists make clear that we must not allow further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

This draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

I am aware of several issues with the current draft report you issued on October 8th. If these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

This proposed facility will not benefit the region and in fact will jeopardize efforts to promote clean, sustainable energy solutions. Thank you for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.
Katharine D. Barrett
Retired Teacher

Katharine Barrett
kdbarrett08@gmail.com
31 Dos Posos
Orinda, California 94563

From: Kerri Bates <Kerri@saltchuk.com>
Sent: Friday, November 2, 2018 5:50 PM
To: Public Comment
Subject: SEIS Letter
Attachments: Puget Sound Clean Air letter.pdf

Please see attached. Thank you.

Kerri

Kerri Bates | Senior Coordinator | **Saltchuk**
direct: 206.652.1131 | mobile: 817.501.6134 | fax: 206.381.8308 | kerri@saltchuk.com
450 Alaskan Way S. | Suite 708 | Seattle, WA 98104 | www.saltchuk.com



SALTCHUK

Mark Tabbutt
Chairman

450 Alaskan Way South, Ste 708
Seattle, WA 98104

www.saltchuk.com

October 30, 2018

Puget Sound Clean Air Agency

RE: TACOMA LNG PLANT

TOTE is a wholly owned subsidiary of Saltchuk. Saltchuk is a second generation family owned and managed Seattle based company. Our owners all grew up in the Pacific Northwest and are all strong environmentalists.

As an organization, we are extraordinarily proud of our multi-generational environmental stewardship. These are not words, these have been enormous financial commitments that surpass both private and public spending state wide. Here are a few examples just within our marine operations:

- In the mid-1990s, our subsidiary Foss Maritime made an $80 million investment and converted all of our California oil bunker barges to double hull seven years before required by law;
- In the early 2000s, our subsidiary TOTE constructed the Orca class vessels to serve Alaska with double hulls for fuel, redundant independent propulsion systems, leading to the receipt of numerous industry environmental awards;
- Foss converted to solely using ultra-low sulfur diesel in all of our West Coast harbors several years before required by law;
- TOTE was the first in Puget Sound to convert and install shore power for “cold iron” while at the dock, significantly reducing emissions while at the Port of Tacoma;
- TOTE was the first cargo terminal in Puget Sound to invest in and build a rain garden, leading to zero discharge into the waters;
- Foss was the first company in the United States to design, build and operate hybrid tugs, capable of motoring at 6 knots using battery power;

Our most recent investment eclipses all of these efforts. A decision was made to convert all of our domestic ship operations to use environmentally cleaner liquified natural gas at a total investment of over $700 million. While less expensive options were available, including installing scrubbers which could result in increased ocean pollution, our Company proudly pursued the most environmentally responsible course of LNG with President Obama’s EPA. We chose not to simply meet federal, state and

SALTCHUK

local emission requirements, we chose to exceed them. It was a significant stretch for us, but as a family owned company based here, we sought to make a generational commitment to the cleanest available fuel source.

We are well on our way to completing this commitment:

- We contracted and had built in San Diego, and now have in operation between Jacksonville and San Juan, Puerto Rico, the first two containerships in the world that use LNG as a fuel source;
- We have committed over $200 million to convert our Alaska ships to burn LNG.
- We contracted and had built in Texas the first US-built LNG Bunker Barge, further recognizing our commitment to the growth of LNG as a clean maritime fuel. The barge will support our Marlin vessels and has the capability of supporting other carriers as well.

The PSE LNG plant is being built based upon our company's anchor tenant commitment. Completing the plant is an essential part of our efforts of making a multi-generational shift to LNG. Just as ships went from coal to oil, we are pioneers of moving from oil to natural gas.

Worldwide, shipping is moving at a remarkable pace from burning the dirtiest fuel to some of the cleanest. Ports that have LNG bunkering capability will attract vessels that are LNG capable. Through our family business commitment, the Port of Jacksonville is today on that list. Once again, through our family business' commitment, we have the opportunity to put the Port of Tacoma on that list and join the worldwide shift to LNG to reduce greenhouse gases

In conclusion, on behalf of my family and the extended family of TOTE employees and customers, we would urge the Puget Sound Air Agency to follow the science and the data and issue the air permit in a timely manner so we can achieve at a minimum the 13.5% reduction of greenhouse gases the Draft Supplemental Environmental Impact Statement confirms.

Sincerely,



Mark Tabbutt

2229-1 22. General Opposition

From: Bob Baylisd
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 12:32:09 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

At some point we need to all stand up to industry and this current administration and make decisions for our children's future. And we should use the right science to acknowledge the real impacts on our environment.

It appears that the science used to help justify this facility is in place to try to sell it to the public, when we should really all be looking at it more from the perspective of what it means to our long-term future on this planet. We in the northwest have always been outspoken about the world we live in, and approving this project is a step backwards for the future of our children the northwest and our planet.

Please do not approve it.

Thanks,
Bob Bayliss

Bob Baylisd
bbbayliss@comcast.net
21715 21st St E
Lake Tapps, Washington 98391

1658-1 3. Outside of SEIS Scope
1658-2 10. LCA Calculations
1658-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Louisa Beal
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 4:58:43 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My concerns regarding the fast-tracking of the LNG plant and other development in our community include:
• Inadequate environmental review.
• Harmful effects of further industrial development to local water, air, animals and people.
• Environmental waste from prior industrial use at the Port of Tacoma still has not been removed.
• Potential for catastrophe in event of earthquake or volcanic eruption.
• Impact of catastrophe near densely populated area.
• The safety of detainees at the nearby detention center.

My concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?

- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Louisa Beal
blackcat@wamail.net
205 Berkeley Avenue
Tacoma, Washington 98466-7218

1658-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1658-5 19. LCA Inputs and Assumptions - End Use
1658-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1658-7 13. LCA Inputs and Assumptions - Natural Gas Source

1789-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 12:10:44 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

We need to take additional steps to save the planet from the devastation we have caused. Climate Change must be taken seriously. Everyone needs to get onboard and only support clean energy. Fracking is the wrong way to go!

Sincerely,

Amy Beazley
drksylph15@hotmail.com
98021

1533-1 22. General Opposition

From: Carmen Becktel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, November 19, 2018 3:23:41 PM

Name: Carmen Becktel
Email: becktel.carmen@gmail.com
Address: 7515 SE Martins ST -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Just read an article in Nation newspaper that fracking wastewater has been found in freshwater mussel shells. According to researchers from Penn State and Union College, elevated concentrations of strontium have accumulated in the shells of mussels located downstream from fracking wastewater disposal sites.

When the f*ck is all the human caused destruction to the planet/environment going to cease?!!?!?!??! When there is absolutely nothing left????? I'm so disgusted with this country and our government who only seem to be regressing instead of progressing in any positive way.

1689-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 14, 2018 12:28:35 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I am concerned about the project for a number of reasons. A few of these are as follows:

- Non-Renewable Reliance, Environmental Degradation, & Toxic Exposure
- Eco-Injustices
- Tacoma Tide-Flats Superfund Cleanup

Non-Renewable Reliance, Environmental Degradation, & Toxic Exposure: The development and use of fracked gas demonstrates an unsustainable reliance upon fossil fuel energy. While we know that this type of non-renewable resource is quickly being depleted (and alternatives must be sought), the extraction process itself further exacerbates environmental "instability," in that the pollutants discharged into the water and air are toxic to human and non-human species:

"PSE's LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution."

Herein, not only is the use of the product unsustainable, but the method of extraction is dangerous.

Eco-Injustices: There is also the likelihood of significant environmental injustices, as historically oppressed communities (specifically the Puyallup Nation) have voiced their concerns about the impacts to the water, air, and as such, their health, values, traditions, etc. The Puyallup Nation must be respectfully heard and their concerns addressed to their satisfaction.

Tacoma Tide Flats Superfund Cleanup: Over the past several years, those living in and around the Tacoma Community have spent an unprecedented amount of time and resources in order to to rectify and remediate industrial damage (caused by ASARCO Simpson Tacoma Craft, municipal wastewater, and others), entities who largely exploited and damaged the Commencement Bay water-systems, leaving toxins and pollution for taxpayers to address. Too, air and water quality concerns impact all within the Puget-Sound bio-Region, being interconnected.

Today, unfortunately, permitting practices have not effectively discouraged limiting the use of the water and air (by industrial polluters) for so-called "legal discharges," thus undermining the spirit and intent of clean air and clean water mandates. In response, I ask that you take into consideration the issues brought forth in this letter and others, and, if necessary, consider the

altogether rejection of permits for this process.

Sincerely,

Amy Belle
WriteAmyBelle@Gmail.com
98520

1363-2 22. General Opposition
1363-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From:	Tom Bender
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Friday, November 16, 2018 10:07:37 AM

Name: Tom Bender
Email: tbender@nehalemtel.net
Address: 38755 Reed Rd. - Nehalem OR 97131
Nehalem, Oregon 97131

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

* This project would NOT displace dirtier methanol production. It would ADD its env. impacts to the other.

* Fracking should NOT BE ALLOWED. We need to REPLACE fossil fuels with efficiency and renewables.

* Export incurs transportation energy consumption and env. impacts, which could be avoided with methanol production at point of use.

* No VIABLE mitigation plan is guaranteed.

* FAR MORE BENEFICIAL alternative employment can be provided in the area through deep energy retrofit of existing buildings and installation of renewable energy facilities.

* Methanol should NOT be used as vehicle fuel. Electric vehicles should be used.

* Methane from vehicle fuel use is 87X MORE DESTRUCTIVE greenhouse gas than carbon dioxide.

0435-2 22. General Opposition
0435-2 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Orion Benedict

Address or email o.rose.benedict@gmail.com

PSE's proposed LNG facility is directly at odds with community health and safety, Puyallup tribal sovereignty, and environmental well-being. The proximity of the plant to Tacoma communities, including the Puyallup reservation, poses dire health risks to those living in the plant's blast zone. Furthermore, the project planning process has violated the Medicine Creek Treaty and the Puyallup tribe has still not been adequately consulted by the agencies permitting this facility.

On a global level, fracked gas leaks methane into the atmosphere which is an extremely hazardous pollutant for our climate. Many in Tacoma are vulnerable to the threat of rising sea levels. We cannot afford to disregard the environmental damage associated

with fracked gas.

I stand in solidarity with the extensive work that Tacoma communities continue to do for social and environmental justice in our area and the agency of the Puyallup tribe. I urge the PSCAA to take to heart the well-being of our communities and the land.

1600-1 5. Regulatory Framework

From: Orion Benedict
To: Public Comment
Subject: No LNG Facility in Pierce County
Date: Tuesday, October 9, 2018 6:21:16 PM

Dear Puget Sound Clean Air Agency,

Puget Sound Energy's proposed LNG facility infringes on Puyallup Tribal land that is deeply important to the tribe. Scientific review has shown that fracked "natural" gas is dirty and has a dire climate impact, and the proximity of the plant's location to the Puyallup reservation and other communities of color would pose serious health and safety risks to folks who are already impacted by environmental racism on a daily basis. There are people living within the "blast zone" of the proposed plant, and if the gas were to combust their lives would be in grave danger.

An LNG plant is directly at odds with community health and safety, tribal sovereignty, and environmental well-being; fracked gas in general contributes to the global crisis of climate change. Along with many others in Tacoma, I stand in solidarity with the communities who would be most impacted by this decision. **Please produce a thorough and accurate environmental review that reflects the true impacts of fracked gas on our air, climate, and communities**. Your agency has an opportunity to use your power and influence in favor of social and environmental justice. Thank you for your consideration.

Sincerely,

Orion Benedict
Tacoma, WA

1949-1 23. General Support

From: Darren Bentley
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 2:27:49 PM

Dear PSCAA,

I am writing in support of PSE's LNG facility in the Port of Tacoma. Just today, I was in the port and noticed thick, black smoke pouring out of a container ship's exhaust stack. The PSE project, by burning clean LNG, will help eliminate this particulate matter from the local environment and improve life for Washington residents. Please approve the Air Permit for the PSE LNG facility.

Sincerely,

Darren Bentley

1207-1 23. General Support

Steve: Thank you. So, next up is Phil Morrell.

Rich: He's not here. Rich Berkowitz is my name. I'm up next, I believe.

Steve: Okay. Rich Berkowitz.

Rich: Thank you. I'm a PSE rate payer and I also live and work next to the Port of Seattle. My role as Pacific Coast director of TI leads me to work on behalf of numerous US flag vessel operators on regulatory training, recruitment, safety, and legislative issues. This includes locally owned TOTE, a notable environmental award winner. I've worked with TOTE, the Obama administration, PSCA, and EPA to find the most environmentally sound response to ongoing interest in reducing harmful regional air emissions, since 2012.

[03:20:02] We support the findings and the draft SEIS of an LNG storage facility being the preferred option. Further, we urge PSCA and policy makers, do not let the perfect be the enemy of the good. In this case, the exceptionally good. If you heed the detractors here today and delay or deny TOTE access to LNG, you send the message to the entire maritime community that no good progressive turn goes unpunished. The LNG facility poses no environmental risk. Not using LNG in maritime vessels does create an environmental and human health risk.

Use of LNG reduces SOx and NOx and particulates of virtually zero. LNG eliminates the threat of oil spills to our salmon, shellfish, and diminishing orca. On freshwater bodies, we can maintain clean drinking water standards. The global environmental community embraces the science related to the 100 year impact standard modeling used by the respected research firm that evaluated the SEIS, a study that is complete, timely, and neutral.

[03:21:07] Despite the rancor shown today, we urge you to support it. There are, literally, hundreds of LNG storage facilities around the US with impeccable safety records. These facilities act as peak savers and ensure an uninterrupted supply of LNG. Thank you for your time. And I appreciate your efforts.

1665-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1665-2 3. Outside of SEIS Scope
1665-3 3. Outside of SEIS Scope

From: Jim Bernthal
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 5:10:31 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Following are several more serious issues that I feel are not adequately addressed in your Draft SEIS for the PSE LNG project:

Global warming:

Methane, the main component of fracked gas, is a greenhouse gas 86 times more powerful than carbon dioxide, when considered for a 20-year period. Out-of-date documents from the EPA and IPCC have used lower estimates for methane's impact as a greenhouse gas. As a critical permitting agency. PSCAA must use the most up-to-date global warming potential for methane, at 86 carbon dioxide equivalents.

Water Impacts from Fracking:

Given the record of water contamination as a result of the fracking process, the SEIS must also consider potential impact on water of
gas that is fracked for the PSE LNG facility, whether the gas is
extracted via fracking from sites in
the United States or from British Columbia.

Water effects in the Tacoma area:

The Tacoma LNG Facility would chill gas down to -260 degrees Fahrenheit, in order to liquefy it for use as a ship
fuel. If there is a spill, the liquefied gas would likely enter the harbor. The
SEIS must include analysis of impact on marine life of a spill.

Thank you for taking these concerns into consideration in modifying your Draft SEIS.

Jim Bernthal
jimbernthal@hotmail.com
4733 46th Ave. S.
Seattle, Washington 98118

1666-1 3. Outside of SEIS Scope
1666-2 7. SEPA Alternatives

From: Jim Bernthal
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 4:57:11 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Here are several serious issues that I feel are not adequately addressed in your Draft SEIS for the PSE LNG project:

Fracking:

By increasing the demand for natural gas in North America, this project will increase the demand for fracking. 2/3rds of all ‘natural’ gas in the US is fracked. Fracking damages public health, pollutes water, and contributes to climate change. The SEIS must include the environmental impacts associated with continued and increased fracking.

Displacing "Dirtier fuels":

The backers of the LNG facility have used the rationale that they are displacing coal, oil or bunker fuels; they are doing this as a platform for "greenwashing". There is no way to prove that other projects will be displaced by the LNG facility. Rather, it is more likely that this project will add more fossil fuel use.

We know that fracked gas is at least as devastating to the environment as coal, when lifecycle emissions are considered. The original justification for the LNG plant was to provide shipping fuel that would replace heavy fuel oil. However, since then the heavy fuel oil has been replaced with low-sulfur diesel to comply with new requirements. We need this SEIS document to focus on the added
environmental impacts of the proposals at hand, without assuming they will displace other proposals.

Jim Bernthal
jimbernthal@hotmail.com
4733 46th Ave. S.
Seattle, Washington 98118

1786-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 12:55:23 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I strongly urge you to refuse to issue the final permit for PSE's LNG project, largely because their LNG facility would increase our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Thank you for taking my input on this matter of critical importance to me and our Puget Sound communities.

Sincerely,

Jim Bernthal
jimbernthal@hotmail.com
98118

2222-2 5. Regulatory Framework
2222-2 3. Outside of SEIS Scope

From: Mike Bird
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Thursday, November 15, 2018 5:10:00 PM

Puget Sound Clean Air Agency,

Dear PSCAA,

I completely endorse the Puyallup Tribe's position regarding the serious errors in the draft SEIS.

But beyond this I oppose any such facilities in this location as the blast radius extends to tens of thousands of residences and much of downtown Tacoma.

Methane is more explosive than the hexane which destroyed 1000 residences in the village of Flixborough and 800 more in Scunthorpe three miles away. Fortunately that was a lightly populated rural area.

A small natural gas leak can easily destroy a house. Recently in the Merrimack Valley a slightly larger incident caused the evacuation of 30,000 in a 10-alarm fire. (Most people are unaware that fires can be more serious than 5-alarms.)

The Kinder Morgan explosion in 2017 shook houses sixty miles away.

Natural gas pipeline explosions occur about three times a year in the US.

The proposed Tacoma facility would require a large 24x7 staff of well-armed guards to protect against ground-based terrorist attacks. Nothing can protect Tacoma from drone attacks or from the most common cause - accidents.

Consider that a 7 ton thermobaric bomb - less 0.1% the size of this proposed facility - has a yield equivalent to 49 tons of TNT. A Tacoma explosion could be larger than Hiroshima. The notion of a half mile blast radius is a falsehood which might well have been deliberately chosen to fit the site. Much of downtown Tacoma is within the blast radius.

What you are considering is equivalent to a pile of TNT many times larger than the steel structure you see.

Mike Bird
mgb@yosemite.net
1711 65th Avenue Northeast
Tacoma, Washington 98422

1774-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 6:22:44 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Lucinda Blackburn
lblackburn821@gmail.com
98908

1820-1 22. General Opposition

From: Blanchard
To: Public Comment
Subject: STOP THE PSE FRACKED LNG PROJECT
Date: Wednesday, November 21, 2018 11:50:34 PM

Fracked natural gas is NOT better for the environment, it's worse. The amount of super polluting methane the fracking industry is leaking into the atmosphere far outweighs any benefits of burning it. Don't believe PSE's hype. I've been an advertising copywriter for over 30 years. I know hype. If Tacoma wants to be in the "energy forefront" it needs to move away from fossil fuels and toward solar and wind energy.

Thanks you for your time and consideration.

PAUL BLANCHARD
3210 North 30th Street
Tacoma, WA 98407
(253) 759-9669
paulblanchardcreative.com

P.S.: Attached is a link to an article published by Cornell University showing how fracking is dirtier than coal.

http://news.cornell.edu/stories/2011/04/fracking-leaks-may-make-gas-dirtier-coal

From: Lee Blankenship <Lee.Blankenship@nmt.us>
Sent: Monday, November 19, 2018 7:15 PM
To: Public Comment
Subject: Public comment

November 19, 2018

Attn: Puget Sound Clean Air Agency

I am a life-long resident of Washington, retired scientist from the Washington Department of Fish and Wildlife and member of the Governor's Orca Task Force Working Group. I have a sense of urgency towards reversing the trend of our declining environment, especially the quality of our air and water. Endangered species like salmon and Southern Resident orca whales are local examples that are suffering from a degraded environment. Residents, businesses and governments must all meet the challenges of improving the environmental we have depredated. We owe this to future generations.

We need to reduce our dependence on fossil fuels as it is one of the major factors responsible for a declining environment. I believe a transition from the traditional diesel fuel powered maritime industry to liquefied natural gas (LNG) is an important step towards cleaner emissions. The use of LNG would significantly reduce harmful gases and particulate matter.

The proposed LNG facility at the Port of Tacoma would be a significant step in the right direction. I encourage PSCAA and the City of Tacoma to reward TOTE Marine for their actions towards a better environment for all of us.

Thanks for your consideration,

Lee Blankenship
NMT
Director of Biological Services
(360) 468-6432 Work
(360) 790-6330 Mobile
lee.blankenship@nmt.us
324 West Bay Drive
Suite 107
Olympia, WA 98502
http://www.nmt.us

RECEIVED
NOV 7 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740

→ 2405 No. Stevens St Tacoma WA 98406

0672-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0672-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0672-3 21. LCA Inputs and Assumptions - Additional Air Pollutants
0672-4 3. Outside of SEIS Scope
0672-5 10. LCA Calculations

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NOV 13 2018
Puget Sound
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Respectfully,

Ron Morrison , Tacoma WA — Ron Morrison

Billie Blattler , Steilacoom WA — Billie Blattler

Carole Galloway, Tacoma WA — Carole Galloway
Puyallup Tribe Mbr #740

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NOV 13 2018
Puget Sound
Clean Air Agency

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Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Puyallup Tribe Elder #740

RECEIVED
NOV 2 1 2018
Puget Sound
Clean Air Agency

November 1st, 2018

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2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Puyallup Tribe Mbr #740



Ms. Carole Galloway
5216 64th St W
University Pl, WA 98467-3702

1259-1 22. General Opposition
1259-2 5. Regulatory Framework
1259-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1259-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1259-5 3. Outside of SEIS Scope

RECEIVED
NOV 2 1 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740



Ms. Carole Galloway
5216 64th St W
University Pl, WA 98467-3702

[03:46:00] So, before I call the next speaker, I'll just give you a heads up of the five after that. Todd Iverson, Virginia Lohr, Betsy Seaton, Mike O'Brien, and Carol Kindt. So, next up is Bethany Llewellyn. Bethany? Okay. June Bluespruce?

June: Hello. I'm June Bluespruce. I have a master's in public health from the University of Washington. And I offer this testimony. I dedicate my testimony to my only granddaughter, Alma, who turned 6 months old today. And I hope that, by the time she's an adult, the earth is still habitable for her. I'm going to sing my testimony. I'm going to need a little help from my friends.

[03:47:00]

[Singing] PSE defies the law their permit's not yet granted. Stop the LNG stop the LNG stop the LNG this plant should get arrested. Fossil Fuel's way out of date we're done with earth destruction. Stop this LNG, stop this LNG, stop this LNG and stop the plant's construction. Hey PSE the rule of law applies to corporations the US government holds a treaty with the sovereign people of the great Puyallup nation. All workers also need our earth to be here for their children, green jobs what we want, our green jobs what we want, our green jobs, we're ready for green futures we can build them. Fossil fuel's a losing game, everyone's divesting, give up fossil fuels, give up on fossil fuels, green power sources now that's where it's worth investing.

[03:48:00]

From: David Bluhm
To: Public Comment
Subject: Puget Sound Energy"s Tacoma LNG
Date: Wednesday, November 21, 2018 2:29:28 PM

Dear PSCAA Board, Staff, Review Committee, and Decision Making Team;

Please let me know that you received this email and public comment.

Please re-open and further expand upon the SEIS for Puget Sound Energy's Fracked Gas/LNG facility.

We are counting on you to usher in the new paradigm that the Salish Sea and Puget Sound Regions and the world must embrace and move toward beginning yesterday. We can not continue in the current paradigm of big oil and fossil fuels throwing huge amounts of money at our communities to force through projects that ultimately have only their own best interests, including exorbitant profits, at heart.

We all know that despite their short term promises for jobs, jobs, jobs and economic growth from such projects, that the biggest motivating force for them are the exorbitant profits they can achieve for their shareholders and/or foreign owned parent companies.

For all practical purposes, it still occurs that business and industry wants to blindly and arrogantly go forward with business as usual. The fact that the 8 million gallon tank is built is one small example of that arrogance and blind momentum.

There are other significant, sustainable and healthy uses for that monstrous tank that has been built on our Port of Tacoma and on the land of The Puyallup Tribe. Puget Sound Energy, the Port of Tacoma and the City of Tacoma have NOT been able to present sufficient evidence to deny that the land this project has been built upon is not Tribal land alone. The fact that PSE and/or its subcontractors have continued building despite District and Superior Court rulings on that fact is utterly ridiculous and violates multiple Treaties of Washington State and the United States government.

As you know, if you do deny the permit, Puget Sound Energy will be able to write off their "losses" as a business expense over at least the next 7 years, if not longer. It is a calculated risk that they and their subcontractors have taken, knowing that they will benefit whether the project is seen to completion and fracked gas actually flows into it or not. They will keep paying their current employees. They will carry forward a business loss and reap tax benefits as allowed by the IRS.

Please use the most current (best) science, historical data, and air pollution measurement technology to perform a truly comprehensive SEIS before definitively and permanently denying the clear air permit for Puget Sound Energy's Fracked Gas LNG project in Tacoma. The partial science, half facts, and happy face green washing lies that PSE continues to uphold to "sell" the project is insufficient at best and criminal at worst.

It is up to you to make it whole and complete in determining the negative impact to our air quality both locally and between points of extraction of the fracking wells to final destination of the ships and other vehicles that may ultimately use that LNG. You must look from cradle

to grave - from its resting place within the earth to end use. We do not operate in a vacuum. The fact that LNG might burn cleaner at the point of use is completely ignorant of the fact that the entire life cycle from extraction to end use is dirtier that the bunker fuels currently used and pollution at any one point in the process is cumulative, not isolated to that one location.

Those bunker fuels are made cleaner through the "scrubbing" technology required on the ships and tugs as I am sure you are aware. Yet that is not discussed by the business and industry leaders - TOTE Maritime and PSE in particular have ignored the cradle to grave evaluation and comparisons in their greenwashed, prettified, window dressed multimillion dollar marketing campaigns being used to deceive local government, ratepayers and taxpayers in the Puget Sound Region and beyond.

The fact the PSE has blindly and arrogantly gone forward with the construction of this facility is no reason to rubberstamp it without a thorough, complete and comprehensive SEIS. The SEIS recently "completed" is not thorough and comprehensive and uses outdated methods for quantifying the air pollution and GHGs that will be created.

PSCAA is the last hope we may have to lead the Puget Sound Region into the new paradigm that we must create for business, industry, consumers and a truly renewable, clean energy future. We are all going to have to tighten our belts, become more disciplined, and poise up to the challenges that lie ahead for the impact we are undeniably having to accelerate climate change through global warming due to our excessive and unreasonable over-consumption of fossil fuels. We are not going to think or invent our way out of this mess using the same methods and ideology that got us into it in the first place. Thus, new ways of thinking are absolutely necessary. Profits will be reduced for business and industry, while consumers must simultaneously find the discipline to consume less. That consumption doesn't necessarily include food, although it very well could or should include some foods.

Denying this permit will send a clear message to the most financially rich industry and business leaders that they must redirect their investment dollars toward those truly renewable and sustainable energy technologies. Denying this permit will strongly persuade them NOT to continue to try and extract every last drop of fossil fuel and the associated profits possible from an industry that has quite possibly irreparably damaged this planet - our lands, waters, air and public health - that we all share unless we head in a completely different direction immediately.

The fossil fuel industry is well on its way to being a bankrupt, dead industry. What we are seeing with current efforts to proliferate the process of hydraulic fracturing to extract natural gas and create demand for LNG across the globe is nothing less than their futile attempts to "stay alive and relevant" when the fossil fuel industry should have been made irrelevant long ago. They are kicking, screaming and clawing - trying to crawl out of an inevitable grave.

I invite you to do research through the South African Department of Mineral Resources to see what they have experienced and what they have been compelled to do as big oil and gas has attempted and continues to try to infiltrate their lands. Again, sold by big oil and gas with lots of happy faces, partial science and facts, and ultimately with only greed and lust behind it. Still being window dressed to this day as a "benefit" to South African villages while their lands and water sources are or will be irreparably contaminated by the process of hydraulic fracturing (fracking) for "natural gas".

Please lead the way to that clean energy and truly clean air future.

Please uphold the motto imprinted on the cover page of your 2014 - 2020 Strategic Plan:
"Clean healthy air for everyone, everywhere, all the time."

Thank you for your time, consideration, and - in advance - for doing the right thing for current and future generations.

Please let me know that you received this email and public comment.

David Bluhm
Tacoma, Pierce County Resident (98404)

1312-4 22. General Opposition
1312-4 5. Regulatory Framework
1312-4 3. Outside of SEIS Scope
1312-4 7. SEPA Alternatives

From: David Bluhm
To: Public Comment
Subject: Tacoma/Puget Sound Energy LNG SEIS and Air Permit Denial
Date: Tuesday, November 6, 2018 11:34:50 AM
Importance: High

Dear PSCAA Board, Staff, Review Committee, and Decision Making Team;

Please re-open and further expand upon the SEIS for Puget Sound Energy's Fracked Gas/LNG facility. Also, please retract my previous email sent at 10:35 a.m. today and make this my most recent comment.

I did not take the opportunity to speak at the public hearing on Tuesday the 30th of October. Truthfully, I had to honor a family commitment and got back after my name had been called. I had originally signed up during the afternoon session but there was not sufficient time for me to talk during it.

Here is some and more of what I would have said:

We are counting on you to usher in the new paradigm that the Salish Sea and Puget Sound Regions and the world must embrace and move toward beginning yesterday. We can not continue in the current paradigm of big oil and fossil fuels throwing huge amounts of money at our communities to force through projects that ultimately have only their own best interests, including exorbitant profits, at heart.

We all know that despite their short term promises for jobs, jobs, jobs and economic growth from such projects, that the biggest motivating force for them are the exorbitant profits they can achieve for their shareholders and/or foreign owned parent companies.

For all practical purposes, it still occurs that business and industry wants to blindly and arrogantly go forward with business as usual. The fact that the 8 million gallon tank is built is one small example of that arrogance and blind momentum.

There are other significant, sustainable and healthy uses for that monstrous tank that has been built on our Port of Tacoma and on the land of The Puyallup Tribe. Puget Sound Energy, the Port of Tacoma nor the City of Tacoma have NOT been able to present sufficient evidence to deny that the land this project has been built upon is not Tribal land alone. The fact that PSE and/or its subcontractors have continued building despite District and Superior Court rulings on that fact is utterly ridiculous and violates multiple Treaties of Washington State and the United States government.

As you know, if you do deny the permit, Puget Sound Energy will be able to write off their "losses" as a business expense over at least the next 7 years, if not longer. It is a calculated risk that they and their subcontractors have taken, knowing that they will benefit whether the project is seen to completion and fracked gas actually flows into it or not. They will keep paying their current employees. They will carry forward a business loss and reap tax benefits as allowed by the IRS.

Please use the most current (best) science, historical data, and air pollution measurement technology to perform a truly comprehensive SEIS before definitively and permanently denying the clear air permit for Puget Sound Energy's Fracked Gas LNG project in Tacoma. The partial science, half facts, and happy face green washing lies that PSE continues to uphold to "sell" the

project is insufficient at best and criminal at worst.

It is up to you to make it whole and complete in determining the negative impact to our air quality both locally and between points of extraction of the fracking wells to final destination of the ships and other vehicles that may ultimately use that LNG. You must look from cradle to grave - from its resting place within the earth to end use. We do not operate in a vacuum. The fact that LNG might burn cleaner at the point of use is completely ignorant of the fact that the entire life cycle from extraction to end use is dirtier that the bunker fuels currently used and pollution at any one point in the process is cumulative, not isolated to that one location.

Those bunker fuels are made cleaner through the "scrubbing" technology required on the ships and tugs as I am sure you are aware. Yet that is not discussed by the business and industry leaders - TOTE Maritime and PSE in particular have ignored the cradle to grave evaluation and comparisons in their greenwashed, prettified, window dressed multimillion dollar marketing campaigns being used to deceive local government, ratepayers and taxpayers in the Puget Sound Region and beyond.

The fact the PSE has blindly and arrogantly gone forward with the construction of this facility is no reason to rubberstamp it without a thorough, complete and comprehensive SEIS. The SEIS recently "completed" is not thorough and comprehensive and uses outdated methods for quantifying the air pollution and GHGs that will be created.

PSCAA is the last hope we may have to lead the Puget Sound Region into the new paradigm that we must create for business, industry, consumers and a truly renewable, clean energy future. We are all going to have to tighten our belts, become more disciplined, and poise up to the challenges that lie ahead for the impact we are undeniably having to accelerate climate change through global warming due to our excessive and unreasonable over-consumption of fossil fuels. We are not going to think or invent our way out of this mess using the same methods and ideology that got us into it in the first place. Thus, new ways of thinking are absolutely necessary. Profits will be reduced for business and industry, while consumers must simultaneously find the discipline to consume less. That consumption doesn't necessarily include food, although it very well could or should include some foods.

Denying this permit will send a clear message to the most financially rich industry and business leaders that they must redirect their investment dollars toward those truly renewable and sustainable energy technologies. Denying this permit will strongly persuade them NOT to continue to try and extract every last drop of fossil fuel and the associated profits possible from an industry that has quite possibly irreparably damaged this planet - our lands, waters, air and public health - that we all share unless we head in a completely different direction immediately.

The fossil fuel industry is well on its way to being a bankrupt, dead industry. What we are seeing with current efforts to proliferate the process of hydraulic fracturing to extract natural gas and create demand for LNG across the globe is nothing less than their futile attempts to "stay alive and relevant" when the fossil fuel industry should have been made irrelevant long ago. They are kicking, screaming and clawing - trying to crawl out of an inevitable grave.

I invite you to do research through the South African Department of Mineral Resources to see what they have experienced and what they have been compelled to do as big oil and gas has attempted and continues to try to infiltrate their lands. Again, sold by big oil and gas with lots of happy faces, partial science and facts, and ultimately with only greed and lust behind it. Still being

window dressed to this day as a "benefit" to South African villages while their lands and water sources are or will be irreparably contaminated by the process of hydraulic fracturing (fracking) for "natural gas".

Please lead the way to that clean energy and truly clean air future.

Please uphold the motto imprinted on the cover page of your 2014 - 2020 Strategic Plan: "Clean healthy air for everyone, everywhere, all the time."

Thank you for your time, consideration, and - in advance - for doing the right thing for current and future generations.

David Bluhm
Tacoma, Pierce County Resident (98404)

1313-1 5. Regulatory Framework

From: David Bluhm
To: Public Comment
Subject: Tacoma/Puget Sound Energy LNG Permit
Date: Tuesday, November 6, 2018 10:35:16 AM

Dear PSCAA Board, Staff, Review Committee, and Decision Making Team;

We are counting on you to usher in the new paradigm the Puget Sound/Salish Sea Region and the world must embrace and move toward beginning yesterday. We can not continue in the current paradigm of big oil and fossil fuels throwing huge amounts of money at our communities to force through projects that ultimately have only their own best interests, including exorbitant profits, at heart.

We all know that despite their short term promises for jobs, jobs, jobs and economic growth from such projects, that the biggest motivating force for them are the exorbitant profits they can achieve for their shareholders and/or foreign owned parent companies.

For all practical purposes, it still occurs that business and industry wants to blindly and arrogantly go forward with business as usual. The fact that the 8 million gallon tank is built is one small example of that arrogance and blind momentum.

As you know, if you do deny the permit, Puget Sound Energy will be able to write off their "losses" as a business expense over at least the next 7 years, if not longer. It is a calculated risk that they and their contractors have taken, knowing that they will benefit whether the project is seen to completion and fracked gas actually flows into it or not.

There are other, significant, sustainable and healthy uses for that monstrous tank that has been built on our Port of Tacoma and on the land of the Puyallup Tribe. PSE, the Port of Tacoma nor the City of Tacoma have been able to present sufficient evidence to deny that the land this project has been built upon is not Tribal land alone. The fact that they have continued building despite Superior Court rulings on that is utterly ridiculous and violates multiple Treaties of the United States government.

Please use the most current (best) science, historical data, and air pollution measurement technology to perform a truly comprehensive SEIS before definitively and permanently denying the clear air permit for Puget Sound Energy's Fracked Gas LNG project in Tacoma. The partial science, half facts, and happy face green washing lies that PSE continues to uphold to "sell" the project is insufficient at best and criminal at worst.

It is up to you to make it whole and complete in determining the negative impact to our air quality both locally and between points of extraction of the fracking wells to final destination of the ships and other vehicles that may ultimately use that LNG. Cradle to grave. We do not operate in a vacuum. The fact that LNG might burn cleaner at the point of use is completely ignorant of the fact that the entire life cycle from extraction to end use is dirtier that the bunker fuels currently used.

Those bunker fuels are made cleaner through the "scrubbing" technology as I am sure you are aware. Yet that is not discussed by the business and industry leaders - TOTE Maritime and PSE in particular have ignored the cradle to grave evaluation in

their greenwashed, multimillion dollar marketing campaigns being used to deceive local government, ratepayers and taxpayers in the Puget Sound Region and beyond.

The fact the PSE has blindly and arrogantly gone forward with the construction of this facility is no reason to rubberstamp it without a thorough, complete and comprehensive SEIS. The one recently completed is not thorough and comprehensive and uses outdated methods for quantifying the air pollution that will be created.

PSCAA is the last hope we may have to lead the Puget Sound Region into the new paradigm that we must create for business, industry, consumers and a truly renewable, clean energy future. We are all going to have to tighten our belts, become more disciplined, and poise up to the challenges that lie ahead for the impact we are undeniably having to accelerate climate change through global warming due to our excessive and unreasonable overconsumption of fossil fuels.

Denying this permit will send a clear message to the most financially rich industry and business leaders that they must redirect their investment dollars toward those truly renewable and sustainable energy technologies. Denying this permit will strongly persuade them NOT to continue to try and extract every last drop of fossil fuel and the associated profits possible from an industry that has quite possibly irreparably damaged this planet - our lands, waters and air - that we all share. The fossil fuel industry is well on its way to being a bankrupt, dead industry. What we are seeing with current efforts to proliferate the process of hydraulic fracturing to extract natural gas across the globe is nothing less than their futile attempts to "stay alive and relevant" when the fossil fuel industry should have been made irrelevant long ago.

Please lead the way to that clean energy and truly clean air future.

Please uphold the motto imprinted on the cover page of your 2014 - 2020 Strategic Plan: "Clean healthy air for everyone, everywhere, all the time."

Thank you for your time, consideration, and - in advance - for doing the right thing for current and future generations.

Sincerely,

David Bluhm
(253) 566-2498
Resident: Tacoma, Pierce County, WA 98404

2544-1 22. General Opposition
2544-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: cyber.bodine@everyactioncustom.com on behalf of Alethea Bodine
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Monday, October 22, 2018 5:26:07 AM

Dear Responsible Official,

Puget Sound Energy and Tote Marine's proposed LNG project is another step toward climate chaos. The IPCC has stated we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues shows fracking allows more methane escapement than we had previously observed. The impact of methane on the climate, particularly in the short term, is even more serious than imagined.

Please listen to the scientists:

Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.

https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106

https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Analyze the lifecycle of the greenhouse impacts of this project. Conduct more rigorous analysis. There is simply too much at stake not to.

Thank you for your time and consideration.

Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.

https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106

https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Alethea Bodine
Erie, PA 16502
cyber.bodine@gmail.com

2234-1 22. General Opposition
2234-2 3. Outside of SEIS Scope
2234-3 5. Regulatory Framework

From: Leah Boehm- Brady
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Sunday, October 28, 2018 8:19:22 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,
I completely oppose this LNG plant.
It will extrude pollutants from processing, and I live downwind.
I will have to leave my home if this monstrosity goes in.
We cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

This plant is far too big for domestic needs. Once the Methanol plant was defeated, this size plant was no longer needed. It is flat-out dumb to frack the countryside, then send the gas abroad.
Very very dumb thinking, this fracked gas.

Please listen to the tribes, they have not been consulted, and they must be!
Their lands are threatened by this plant.

Please do not give permission!

thank you,
Leah Boehm Brady

Leah Boehm- Brady
leahboehm@hotmail.com
841 S. 315th street
Federal Way, Washington 98003

1985-1 23. General Support

From: Brendan Bohannon
To: Public Comment
Subject: PSE LNG Tacoma Support Letter
Date: Tuesday, October 30, 2018 2:10:26 PM
Attachments: PSE LNG Support letter_000194.pdf

Please find in the attached file, the Sailors' Union of the Pacific letter of support for the Tacoma PSE LNG Terminal.

Sailors' Union of the Pacific

TELEPHONE (415) 777-3400
CABLE ADDRESS *SAILORS*
FAX (415) 777-5088

HEADQUARTERS: 450 HARRISON ST
SAN FRANCISCO, CALIFORNIA 94105

BRANCHES PHONE
SEATTLE, 98199 • WEST WALL BUILDING • 4005 20TH AVE W SUITE 115 • (206) 467-7944
WILMINGTON, 90744 • 533 N MARINE AVE • (310) 835-6617
HONOLULU, 96813 • 707 ALAKEA ST • (808) 533-2777

GUNNAR LUNDEBERG • PRESIDENT / SECRETARY-TREASURER

October 30, 2018

The Sailors' Union of the Pacific wishes to express our support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma, as well as in support of the Puget Sound Clean Air Agency (PSCAA) finalizing its SEIS consistent with the draft it issued on October 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

There are many stakeholders in the effort to reduce emissions, and even more moving parts involved in the actual process of doing so. In the last five years alone, the Port of Tacoma, the Port of Seattle and the Vancouver Fraser [Canada] Port Authority have created an updated Northwest Ports Clean Air Strategy with the objectives of reducing port-related air quality impacts of diesel particulate matter, reducing greenhouse gas emissions, and meeting air quality standards and objectives for the airshed. The PSCAA itself is a partner in the implementation of this effort, along with agencies including the Environmental Protection Agency (EPA).

The PSE LNG facility is one part of the task of reducing diesel emissions. LNG fuel cuts particulate matter (PM) emissions produced by ships by more than 85%. These particulates are extremely harmful to the lung health of dock workers and those in the surrounding neighborhoods. According to dock workers, they not only see the black diesel particulates floating in the air, but they breathe them in while ships (still burning diesel) are waiting to dock. Besides eliminating the PM emissions, LNG fuel also reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% and nitrogen oxide (NOx) emissions by nearly 85%. Another important environmental advantage of the utilization of LNG as a fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

Reducing these real-time emissions is a matter of social justice. Sailors & port workers should not be subjected to this polluted air just for doing their jobs. Workers across the West Coast ports have been vocal about the need to reduce these emissions in their work place, and they have played an integral role in supporting ports' efforts such as the Northwest Ports Clean Air Strategy to reduce emissions. Locating the Tacoma LNG facility within the Port of Tacoma advances the effort to reduce emissions at their source.

Beyond emissions affecting ports and immediately adjacent neighborhoods, the United States has staked out the position that vessels must control emissions when travelling America's coastlines up and down the Pacific Ocean. Annex 6 to the MARPOL Treaty, for which the EPA is the enforcing agency, requires Jones Act-flagged ships that travel near to shore to significantly reduce their emissions by using cleaner fuels. TOTE's use of fuel from Tacoma LNG to power its fast-transit, near-shore ships allows the company to substantially exceed its regulatory commitment to the EPA. By using LNG, TOTE will provide major emissions reductions benefitting public health for all communities and residents along its West Coast route, which transits nearly all of Puget Sound and ends in Anchorage, Alaska. Furthermore, US flag vessels engaged in International commerce are faced with ever increasing emission regulations in foreign ports. Vessels are consistently being called upon to be cutting edge and to be within compliance of often more stringent international standards than we face in the United States. Non-compliance with International emission reduction standards will create further disadvantages and barriers to US shipping and industry.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine result in reduced life-cycle GHG emissions."

Taking into consideration the overall reduction in greenhouse gas emissions confirmed by the draft SEIS for Tacoma LNG, and the human and environmental benefits of such reductions, I fully support PSCAA finalizing its SEPA review and granting the necessary permit(s) so this important addition to our region can be completed within its new scheduled timeframe.

The Tacoma LNG facility is a project that allows multiple stakeholders – Washington coastal communities, the Port of Tacoma, adjacent neighborhoods, PSCAA, EPA and TOTE - to affirmatively advance their interests in emissions reductions. Speaking for the US Merchant Mariners serving in the ports of the Pacific Northwest, our health and economic well-being are substantially furthered by this project's timely environmental review and permit process conclusion. Please, support the creation of sustainable, family wage jobs at the Port of Tacoma, which also improve air quality and workers health.



Brendan Bohannon

Sailors' Union of the Pacific

Seattle Branch Agent

1785-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 1:14:08 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup Tribal land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

As a lifelong member of the community, I one hundred percent oppose any development of fossil fuel projects. The proposed PSE Liquified Fracked Gas facility poses a great threat to our water and air on the Tacoma Tideflats and surrounding communities. Further, the horrific process of fracking natural gas from Mother Earth is abhorrent, and the transportation of that gas has shown to be inefficient in fiery explosions across the country; not to mention the leaking of gases into our air.

Energy derived from fossil fuels is dirty and finite, and with that in mind, I implore all companies engaged in that industry work toward redirecting their business plan to renewable energy. Otherwise, they too face extinction.

Sincerely,

Darlin Boudreau
boudreau33@comcast.net
98001

1757-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 8:49:30 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Drea Bowen
drea.b.bowen@gmail.com
98383

1561-1 22. General Opposition
1561-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1561-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1561-4 3. Outside of SEIS Scope

From: Elly McGahan
To: Public Comment
Subject: DSEIS, PSE LNG project
Date: Tuesday, October 30, 2018 11:19:35 PM

To: Puget Sound Clean Air Agency,

I am a mathematician who lives in Tacoma and have raised my family here. Part of my work is with young children. I have become intensely concerned with the climate change that we are causing with the emissions of greenhouse gases. The latest report issued by the UN Intergovernmental Panel on Climate Change has made clear that we do not have the luxury to think in a 100 year time scale, but need to think in a 20 year time scale. In that time frame we need to rapidly reduce our emissions of greenhouse gases. The SEIS analysis uses emissions numbers based on the 100 year time scale, and uses old numbers instead of the most current numbers. Using the 20 year time scale those numbers are much higher for methane. Methane is the gas of concern in relation to the LNG plant. There is consensus that natural gas burns cleaner than marine fuel, but there is also the science that clearly shows over the lifecycle of natural gas from production to use as fuel, the GHG emissions is seriously high because of methane leakage. Letting this project move forward as is would increase Tacoma's GHG emissions instead of decreasing them. We need to bring them to zero and then go further to reduce what is already in the atmosphere. Adding to them at this point in time is entirely in the wrong direction and the consequences for us all will be disastrous with loss of land, loss of clean air, loss of livelihoods, loss of food production, loss of clean water, and shortening of life spans. The SEIS needs to be revisited including the latest numbers for GHG emissions in a 20 year time span, and the project cannot move forward until then. If a method is found to capture and monitor the capture of methane in real time publicly at the fracking site where the natural gas is being obtained, along the route the gas travels to the plant, and also account for any GHG emissions caused by the fracking process itself, so that it there is no doubt that total emissions is coming down over the lifecycle of the gas, then the project can be considered.

I continue to have concerns about the viability of where the plant is located with respect to flood zones given the expected sea level rise and storm surge expectations within the next 20 years. The safety concerns are real. As citizens we rely on you to be the watch dogs and use the best available data and science to determine whether a plant such as this one can be safe for our air, or whether it is time to no longer accept fossil fuel plants of any type. We are at a cross roads. It can't be business as usual, we need to change course.

I am looking for a decision that puts our air first, takes us on a course of reducing GHG emissions, and will help mitigate the impacts of climate change to come.

Thank you for your efforts.

Elly Claus-McGahan

Elly Claus-McGahan, PhD
Sound Decisions Consulting

4301 N. Frace St.
Tacoma, WA 98407

email: DrElly@sound-decisions.org
Phone: 253-219-9129


Virus-free. www.avast.com

2241-1 22. General Opposition
2241-2 10. LCA Calculations
2241-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2241-4 10. LCA Calculations
2241-5 13. LCA Inputs and Assumptions - Natural Gas Source

From: Margot Boyer
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Tuesday, November 20, 2018 11:42:02 AM

Puget Sound Clean Air,

I'm a VAshon resident, just across the water. Like most educated citizens, I'm concerned that human-caused climate catastrophe is destroying our future, our civilization, and most life on earth.

Knowing what we know about climate change, investing in new fossil-fuel infrastructure is not just a bad idea, it's downright suicidal. If Tacoma is to have a future, it will require a massive effort to change our energy infrastructure, starting right now.

Building an LNG plant in the middle of Tacoma is nuts. The SEIS has been written to avoid the problem by fudging numbers. For example, it uses old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should use the 20-year numbers instead of the 100-year, since this plant will be operational for only 40, and we'll see big impacts from the beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Since I'd like to see civilization, and Tacoma, have a future, I'm obviously opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

We existing in a pivotal moment of human history; your actions have implications far beyond this moment of time.

Margot Boyer
mfboyer@fastmail.com
PO Box 746
Vashon, Washington 98070

Steve: Thank you. Carole Sue Braaten?

Carole: Carole Sue Braaten, quickly. This environmental impact statement supplement is inadequate, totally and completely.

[05:34:00] I've read it. And, in fact, it was hard to get and hard to obtain. First of all, it says that it does not address the state environmental impact policy. And it also says it was addressed in the final environmental impact statement. It was not. I read that seven to eight times through or more al eight hundred pages. It's totally and completely inadequate. It does not follow the RCW4321C Safety, Air Quality, and Others. It's inadequate, and it's substantially deficient. It's missing the maps in here, so that you can see where the air travels. It's missing other statements in here that are talking about the flaring.

It didn't tell us that it was an import because you may not have jurisdiction. FERC may, Federal Energy Regulatory Commission. And we need to find that out. That's important.

[05:35:00] They're not telling you everything you need to know. These people are not completely up front with you. And they aren't up front with POC either. I'm sorry to say this. They want everybody's money. They left out RCW3670A, which is part of it. They left out the WAC. They left out that natural gas, in this state, is qualified by two different things. 1) From a garbage dump and a waste water treatment plant that is clean natural gas, that's what the legislature said. That's not what I said and the state attorney general says. And for petroleum based products. You need to know that. And they need to know that.

And it needs to be up front, so they know that they can only operate one to two days a month, if that, every two months. So, the whole thing is shut down. It doesn't even matter whether it's a geological hazard or not, which it is.

[05:36:00] And you need to consider the mass destruction or rather the Tacoma Fire Department's actual explosion that they had, it uses the action of the 1949 earthquake. And it will liquify. I took soil science. I majored in agricultural science. And I will tell you that it will liquify. It will crash, and the whole thing will go. And then, you're going to have a lot of up emissions. And there's a lot more. But I'm concerned. Thank you.

1118-1 1. Determination of SEIS Scope - Comparison to FEIS
1118-2 22. General Opposition

1617-1 11. LCA Inputs and Assumptions - General
1617-2 1. Determination of SEIS Scope - Comparison to FEIS

From: Carole
To: Public Comment
Subject: Port of Tacoma PSE LNG SEIS
Date: Wednesday, November 21, 2018 4:26:37 PM

Carole Sue Braaten
2410 Berry Ln E.
Fife, Wash., 98424
Cell # 253-380-1247

Puget Sound Clean Air Agency
1904 Third Ave., Suite 105
Seattle, Washington, 98101

Dear Puget Sound Clean Air Agency,

This is for Public Comment on the Port of Tacoma Puget Sound Energy Liquid Natural Gas Facility.

1. Numerous times throughout the SEIS it is mention by the company Ecology and Environment, Inc. That they had not yet received information they had they had requested from, Puget Sound Energy it was missing and not received in order to complete the SEIS. Also multiple Air Quality information and Greenhouse Gas information was missing from the FEIS where it is stated the Public safety Air Quality was addresses which they were missing.
    1. Have all documents requested by Ecology and Environmental, Inc and the company hired by them been obtained from Puget Sound Energy for the Port of Tacoma Liquid Natural Gas for the SEIS have the documents all been received in wholly and entirely and are all the documents requested included in the SEIS yes or no? If no what parts are missing and not included name any, all and each and every missing document? If parts are missing what part of the document and what it is for. Are all the documents requested all included in the SEIS given out for people to comment on yes or no? If no when will they be available for Public comment? when?
    2. Was a Legal Law Letter of DEMAND written to obtain these documents yes or no? If no Why not? These are legal needed documents that are being withheld that are required for Public Safety and Air Quality. Without them the FEIS and SEIS are inadequate and incomplete and MUST BE so Stated by laws.
2. Over 180 of The maps of the 200 scenarios are also all Missing from both the FEIS and SEIS showing the Fugitive Emissions from the LNG Facility for the Air Quality and Greenhouse Gas Emissions to make public comment on that were to be included in the FEIS but were not and supposee

From: Carole
To: Public Comment
Subject: Port of Tacoma PSE LNG
Date: Wednesday, November 21, 2018 4:26:05 PM

Carole Sue Braaten
2410 Berry Ln E.
Fife, Wash., 98424
Cell # 253-380-1247

Puget Sound Clean Air Agency
1904 Third Ave., Suite 105
Seattle, Washington, 98101

Dear Puget Sound Clean Air Agency,

This is for Public Comment on the Port of Tacoma Puget Sound Energy Liquid Natural Gas Facility.

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    1. Have all documents requested by Ecology and Environmental, Inc and the company hired by them been obtained from Puget Sound Energy for the Port of Tacoma Liquid Natural Gas for the SEIS have the documents all been received in wholly and entirely and are all the documents requested included in the SEIS yes or no? If no what parts are missing and not included name any, all and each and every missing document? If parts are missing what part of the document and what it is for. Are all the documents requested all included in the SEIS given out for people to comment on yes or no? If no when will they be available for Public comment? when?
    2. Was a Legal Law Letter of DEMAND written to obtain these documents yes or no? If no Why not? These are legal needed documents that are being withheld that are required for Public Safety and Air Quality. Without them the FEIS and SEIS are inadequate and incomplete and MUST BE so Stated by laws.
2. Over 180 of The maps of the 200 scenarios are also all Missing from both the FEIS and SEIS showing the Fugitive Emissions from the LNG Facility for the Air Quality and Greenhouse Gas Emissions to make public comment on that were to be included in the FEIS but were not and suppose to be in the SEIS. All of the maps of the scenario of the Fugitive Emissions are missing from the SEIS the Greenhouse Gas Emissions and other chemicals and wind speeds and maps must be included for comments so we can all see where the Fugitive Emissions are Drifting. I am asking for any, all and each and every

scenario that was done of the 200 maps of All of the fugitive emission , greenhouse gases and toxic chemicals that are mentioned in the that went off of the 33 acre site how far it traveled and the circumstances under which they occurred?

Carole Sue Braaten

1389-1 22. General Opposition

From: Reid Bramble
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:17 PM

Name: Reid Bramble
Email: Epileproso@gmail.com
Address: 6636 North Richmond Avenue -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To you, officials, I would say: as a citizen of the northwest, as a father, and as a farmer, we do not want any further fossil fuels extraction, refinement, transport, or export. Period. The interests that are pushing for this project do not represent us.

1398-1 22. General Opposition

From: Reid Bramble
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:04 PM

Name: Reid Bramble
Email: Epileproso@gmail.com
Address: 6636 North Richmond Avenue -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To you, officials, I would say: as a citizen of the northwest, as a father, and as a farmer, we do not want any further fossil fuels extraction, refinement, transport, or export. Period. The interests that are pushing for this project do not represent us.

1409-1 22. General Opposition

From: Reid Bramble
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:54 PM

Name: Reid Bramble
Email: Epileproso@gmail.com
Address: 6636 North Richmond Avenue -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To you, officials, I would say: as a citizen of the northwest, as a father, and as a farmer, we do not want any further fossil fuels extraction, refinement, transport, or export. Period. The interests that are pushing for this project do not represent us.

1422-1 22. General Opposition

From: Reid Bramble
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:41 PM

Name: Reid Bramble
Email: Epileproso@gmail.com
Address: 6636 North Richmond Avenue -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To you, officials, I would say: as a citizen of the northwest, as a father, and as a farmer, we do not want any further fossil fuels extraction, refinement, transport, or export. Period. The interests that are pushing for this project do not represent us.

1434-1 22. General Opposition

From: Reid Bramble
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 11:51:45 PM

Name: Reid Bramble
Email: Epileproso@gmail.com
Address: 6636 North Richmond Avenue -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To you, officials, I would say: as a citizen of the northwest, as a father, and as a farmer, we do not want any further fossil fuels extraction, refinement, transport, or export. Period. The interests that are pushing for this project do not represent us.

0819-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

RECEIVED
NOV 9 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Shayd Breckenridge

Address or email shaydbreck@hotmail.com

I am in full support of the Tacoma LNG facility. I feel it is a step in the right direction for lowering emission of cargo ships. I also feel in will creat jobs and help our already flowishing state economy.

1334-1 22. General Opposition

From: Sarah Brenner
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, November 19, 2018 10:54:51 AM

Name: Sarah Brenner
Email: ms.sarah.brenner@gmail.com
Address: 3939 SW Bond Ave - 621
Portland, Oregon 97239

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I'm not going to write a big fancy letter telling you all the reasons this is a bad idea. You already know it is. So I'll just say: no.

1496-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Robert Bresky
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:20 PM

Name: Robert Bresky
Email: bobthenatureguy@gmail.com
Address: 16114 S. Hattan Rd. - 16114 S. Hattan Rd.
Oregon City, Oregon 97045

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puget Sound Clean Air Agency should go back to the drawing board - The draft SEIS does not account for the full climate impacts of fracked gas. The analysis is incredibly flawed and unacceptable, and we need the Air Agency to do better before they decide on the air permit for the facility.
The draft SEIS uses an outdated methane global warming potential (GWP) value - GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane has a much larger GWP value, especially over the short term. The draft SEIS uses the United Nations' 2007 value of 25 for the 100-year number (i.e. the methane average GWP over 100 years), whereas they should be using the 2016 value of 32. This single modification in SEIS GHG model makes the LNG plant dirtier from a greenhouse gas emissions perspective than if the LNG plant were not built.

Report
20-year GWP
100-year GWP
2007 IPCC AR4
72
25
2013 IPCC AR5
84
28
2016 Scientific Study (authors include lead from 2013 study)
96

32
Methane is significantly more potent in the near-term, yet the SEIS analysis only looks at the long term impact - Methane is a significantly more potent greenhouse gas than carbon dioxide, especially in the short term. The draft SEIS analysis is based on the 100-year GWP of methane. The IPCC report released a report on October 8th, indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years. Therefore, the SEIS should use the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 50% dirtier than the current capability.
Lack of evidence that BC fracked gas is as clean as they claim - The draft incorrectly assumes

that B.C. fracked gas would result in a significant GHG emission reduction. The reports used to justify such conclusion were models or self reported by industry. The three B.C. based reports all require further analysis to determine if they can even be extrapolated to B.C.-wide fracking wells. One of the reports, states that
recent 2017 and 2018 reports, that use empirical, independent physical studies at well sites. The 2018 report found that 85 percent of active wells are
directly venting methane daily, and that those leakages have been historically underreported. The same report found that methane emissions in BC are 2.5 times higher than reported.
No guarantee that all of the fracked gas would come from BC - The draft claims that all of the natural gas will be coming to the facility from British Columbia. During the recent natural gas pipeline explosion in B.C. on October 10th, it is our understanding that PSE was able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. PSE's own 2017 10K filing with the Securities and Exchange Commission (SEC) shows that in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). How will the Air Agency hold PSE accountable to bringing in only B.C. gas?

Carole: Thank you. Holly Brewer?

Holly: Wow, it's bright up here. I'm Holly Brewer. I've lived in Washington State for 22 years. And I need to breathe, and my children need to breathe. We need the factual data in the report before it could even be reviewed and approved. So, this process feels kind of null and void.

[01:36:00] And once LNG is the default fuel, it's liable to continue to be. So, I believe the research has defined better sources, cleaner alternatives. That won't be encouraged because it won't be necessary, at that point, because there will be an option. Also, there are only just over 100 ships powered by LNG in operation out of a worldwide fleet of 90,000. And getting permits for their conversions could take years and is not guaranteed. So, this is not necessarily necessary. And the PSE say that they will use liquid natural gas from BC, but recent filings show that they have relied on gas from BC, Alberta, and parts of the United States.

And with the recent pipeline explosion in BC that people keep talking about that interrupted PSE's supply, we also know that it wouldn't always be available because accidents happen. And we know that its transportation, over long distances, and its storage is potentially extremely dangerous.

[01:37:00] And it's a terrible site for it. In addition, the Puyallup Tribe needs to be properly consulted because of the environmental impacts, which could be very, very frightening. Thank you.

Steve: Next up, Kenra Brewer.

Kenra: Yes, I am the Kenra. I live on the east side.

[04:43:00] A man died beneath my hands once. I was riding the train to Portland, when there was a call overhead for a medical professional. When I arrives at the scene, the middle aged passenger was already unconscious. The seat next to him was littered with inhalers. A nebulizer sat still on spewing mist. These were his final attempts to bring air to his struggling body. Despite our best efforts at resuscitation and manic pleas, he was gone. The need for air, particularly clean air, is something humans cannot get around. We have allowed the fossil fuel industry to decide the limits of what's possible for far too long.

They say that asthma attacks in infants are normal, that cancer in midlife just happens, that COPD is okay because you can live many years with it. When babies are born with birth defects, it's unfortunate. When people are killed by pipeline explosions, it's a sad accident.

[04:44:00] They preach that fossil fuels are the only way and, certainly, won't take any responsibility for any of the aforementioned health threats. If we shake off this hand me down lie of a paradigm, we can begin to imagine and build a better world. It is possible. As a nurse, I am committed to reducing suffering, supporting health, and advocating for justice. I stand with 350 Tacoma, Washington Physicians for Social Responsibility, and the Puyallup Tribe in opposition to PSE's LNG facility. While I appreciate your decision to assess lifetime greenhouse gas emissions for this project and the work put into this SEIS, it is, unfortunately, incomplete, inaccurate, and based on hypothetical scenarios and assumptions.

In light of the recent and alarming IPCC report forecasting a painful climate crisis sooner than expected, allowing further development of fossil fuel infrastructure and unnecessarily increasing demand for fracked gas is unacceptable. Permitting this facility deepens our dependence on fossil fuels, at a time when we must urgently and justly transition to renewable and sustainable energy.

[04:45:04] I'm asking you to revise the SEIS with the latest science, based on here and now reality and remove any overreach into possible futures that you have no way of enforcing. Thank you.

1327-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1327-4 14. LCA Inputs and Assumptions - Leakage/Slippage

From: rsb2
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 11:01:59 AM
Attachments: Comments on Tacoma LNG.doc

Attached in Microsoft Word format are public comments on the DSEIS for PSE LNG Project. I have also copied the comments into this message below, however footnotes are not preserved, so, if at all possible, please use the attached version.

Would you please be so kind as to acknowledge receipt of these comments.

Thank you

Robert S. Briggs

Email: rsb@turbonet.com
Mobile: 509-330-6793
Home: 206-259-3957
9514 SW Burton Drive
Vashon Island, WA 98070

Date: Wednesday, November 21, 2018

To: Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

From: Robert S. Briggs
9514 SW Burton Drive
Vashon, WA 98070
509-330-6793

Subject: Public Comments on DSEIS, PSE LNG Project

The Draft Supplemental Environmental Impact Statement's treatment of fugitive methane emissions is inadequate both in terms of the clarity of presentation and the assumptions used. Work presented in this fashion would not pass muster in a referred scientific publication, and there is no reason why the PSCAA should accept work this weak as the basis for an important energy infrastructure decision.

As a retired scientist familiar with the literature on fugitive methane emissions, I expected to find in the document clear statements of the assumptions used with respect to methane leakage rates in each stage of the life-cycle and the assumed global warming potential for methane. These are the key values that will determine whether study findings conclude that Tacoma LNG will mitigate or exacerbate global warming.

The nearest I have found in the DSEIS to a statement of what assumptions were used for these pivotal values occurs on page 8, Table 2.1 for GWP and on page 100, Table B.1 for fugitive emissions rate. I believe that in both cases the study authors selected erroneous values.

The discussion on page 8 attempts to justify the use of the AR4 GWP_{100} value. As anyone familiar with the *Special Report on Global Warming of 1.5 °C (SR15)* [1] issued on October 8 would understand, the need to reduce greenhouse gas emissions is near-term and urgent. This analysis should use the GWP_{20} value for fossil methane of 85 from Table 8.A.1 [2] Diluting the impact of near-term decisions by averaging them over 100 years makes no sense in the current context in which scientist tell us we may have only 12 years to drastically alter course.

The DSEIS does not state what fugitive methane emissions rate was assumed in the study. I have inferred that the values of 135.4 and 6.8 g/mmBtu, LHV shown for recovery and processing, respectively in Table B.1 where the values used, although this is unclear in the text. It is odd and puzzling that the authors present this crucial information in nonstandard and cryptic units, that aggregate leakage rate, energy content, and GWP. The units make it difficult for anyone, including scientists with relevant expertise, to determine what was assumed in the analysis or to compare the values to those presented in Table B.3, which shows some recent estimates from the scientific literature.

Table B.3 presents gas leakage in the logical and customary fashion; i.e., as a percentage of gas delivered. I note that a recent study appearing in Atmospheric Chemistry and Physics using sophisticated, on-ground, gas-detection instruments in gas fields in Northeast British Columbia found fugitive emission rates to be 2.5 times higher than the provinces estimates but was [3] not included in the table. This seems like an important omission to correct, otherwise it gives the appearance that the data were cherry-picked.

Also, missing from the discussion is any mention of the high rates of methane leakage from abandoned gas wells. There is ample empirical evidence that the gas industry has not properly capped abandoned gas wells, and I don't see that this issue has been addressed in the DSEIS life-cycle assessment. Unless there is both regulation and bonding requirements to ensure the industry has the resources to properly decommission gas wells, it seems unreasonable to assume that these emissions will not continue in the future. This fact should be included explicitly in this analysis.

Table C.2 embeds assumptions about unburned methane from using LNG in marine engines. Apparently, this flows from default assumptions within the GREET model. Yet it appears from the values in Table C.2 that it would require only a slightly larger amount of unburned methane to be released by these engines than assumed for the LNG $CO2_{equivalent}$ emissions benefit to reverse and become a liability, even using the low and incorrect GWP for methane. What assumptions were used on unburned methane, so called "methane slip" in this analysis? I infer from Table C.2, that the value was about 1.2%.

I note that methane slip is a very big issue, and that any greenhouse gas benefit from LNG may be negated by the particular engine design and combustion conditions. A recent study by the European Commission found methane slip as high as 3.6% [4] under low-load conditions. Has PSCAA evaluated TOTE's proposed engine replacements/modifications to verify that they will produce lower $CO2_{equivalent}$ emissions than with bunker fuel, and have test results been reviewed? There are tradeoffs between unburned methane, formaldehyde and NO_X emissions and efficiency that are particularly problematic in [5] large bore engines. The current documentation provides no evidence that this issue has been examined, and is likely a more problematic issue if the engines are to be retrofit for LNG rather than replaced.

The DSEIS conclusion that Tacoma LNG will reduce greenhouse emissions, even though only marginally, is clearly dependent on assumptions on which there is high uncertainty and substantial controversy. It is customary in such circumstances to perform sensitivity studies. Ecology and Environment, Inc., should be tasked with adding sensitivity studies that indicate how their key conclusion regarding greenhouse gas emissions would be affected by alternative assumptions for these uncertain parameters. Sensitivity studies should be performed to assess the impact of using the appropriate GWP_{20} values for methane and nitrous oxide, for using fugitive methane leakage rates that reflect the range of recent research findings, and for alternative assumptions on methane slip, if definitive data are not available from TOTE. The same issue applies to other future marine, rail, and highway users of LNG. PSCAA should not abrogate its authority to regulate greenhouse gas emissions by granting approval for Tacoma LNG and as a result become powerless to prevent counterproductive LNG conversions.

On page 4-13, DSEIS authors recommend that a required condition of an NOC Order of Approval be that the gas be sourced from British Columbia and that terms be included in the order to ensure that this condition is met on a continuous basis. I strongly support the intent of this recommendation, although a better solution would be to require all gas sources to be periodically tested by a credible entity, so that domestic producers see an incentive for low emission operations rather than be automatically barred from this market.

Similarly, because PSE proposes specific uses for the LNG and requests approval based on benefits resulting from those uses, an additional condition for the facility's approval should be that the LNG produced not be available for export. While fracked gas has been touted as a bridge fuel, it's actual role has been to stifle development of renewable energy. It is not in the interest of citizens of our region to have our ports used for fossil fuel commerce between Canada and other nations. Such commerce would have the effect of stifling renewable energy development in those importing countries and increasing global greenhouse gas emissions, which would in turn contribute to deteriorating air quality for the Puget Sound from forest fires and other consequences of climate change.

The Tacoma LNG project imposes risks on Tacoma and its inhabitants. The plant's tank when filled to capacity would contain the energy equivalent of 12 Hiroshima-sized nuclear bombs. This presents an accident risk as well as creating an easy target for acts of terrorism. Clearly, this facility imposes cost and risks on our community, and it should only be permitted if it also offers real benefits to our region and not just to foreign investors.

PSE's claimed benefit of peak shaving is illusory. PSE can meet its peak needs more easily and more cheaply by simply not taking on new gas customers and deploying cost-effective gas conservation, thereby putting greenhouse gas emission from the gas sector on a controlled downward path. There are no uses for gas—residential, commercial, or industrial—that cannot be met with renewable electricity. Phasing out fossil methane is imperative if we are to meet any of our climate goals, and

1327-5 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-7 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-8 14. LCA Inputs and Assumptions - Leakage/Slippage
1327-9 12. LCA Inputs and Assumptions - Global Warming Potential Value
1327-10 13. LCA Inputs and Assumptions - Natural Gas Source
1327-11 19. LCA Inputs and Assumptions - End Use
1327-12 3. Outside of SEIS Scope
1327-13 17. LCA Inputs and Assumptions - Peak Shaving

1327-14 7. SEPA Alternatives
1327-15 7. SEPA Alternatives

doing so will improve air quality, and will ensure the safety of our community, at the lowest possible cost.

The study authors were tasked with comparing Tacoma LNG only to the no-action alternative. This leaves unaddressed the question of what alternatives to bunker fuel exist for ocean shipping. Several commenters at the October 30 public hearing claimed that there were no alternatives the could clean our air and cut greenhouse gas emissions. But Tacoma LNG commits us to an unsustainable path at a time when carbon-free alternatives are close at hand.

There are several energy carriers that can be produced using renewable electricity and have the potential to replace bunker fuel in marine power systems, while clearing the air and cutting carbon emissions. These include dimethyl ether (DME), alkane blends synthesized from renewable electricity using the Fischer-Tropsch process, methanol, ammonia, and others. Deploying LNG in this unsafe location will commit us to a technology and fuel that must be curtailed if we are to preserve a livable planet. Doing so will preclude the deployment of the clean sustainable energy systems that are now or soon will be available to us as a consequence of the plummeting cost for renewable electricity.

Respectfully submitted,

Robert S. Briggs

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[1]

V. Masson et al., IPCC, 2018: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* https://www.ipcc.ch/report/sr15/

[2]

Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf

[3]

Emmaline Atherton, et al., *Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada*, Atmos. Chem. Phys., 17, 12405–12420, 2017 https://doi.org/10.5194/acp-17-12405-2017.

[4]

Methane emissions from LNG-powered ships higher than current marine fuel oils, Science for Environment Policy, 28 January 2016, Issue 444. http://ec.europa.eu/environment/integration/research/newsalert/pdf/methane_emissions_from_lng_powered_ships_higher_than_current_marine_fuel_oils_444na4_en.pdf

[5]

CIMAC Position Paper, Methane and Formaldehyde Emissions of Gas Engines, International Council on Combustion Engines, 04|2014 By CIMAC WG 17, Gas Engines https://www.cimac.com/cms/upload/Publication_Press/WG_Publications/CIMAC_WG17_2014_Apr_Position_Methane_and_Formaldehyde_Emissions.pdf

Date: Wednesday, November 21, 2018

To: Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

From: Robert S. Briggs
9514 SW Burton Drive
Vashon, WA 98070
509-330-6793

Subject: Public Comments on DSEIS, PSE LNG Project

The Draft Supplemental Environmental Impact Statement's treatment of fugitive methane emissions is inadequate both in terms of the clarity of presentation and the assumptions used. Work presented in this fashion would not pass muster in a referred scientific publication, and there is no reason why the PSCAA should accept work this weak as the basis for an important energy infrastructure decision.

As a retired scientist familiar with the literature on fugitive methane emissions, I expected to find in the document clear statements of the assumptions used with respect to methane leakage rates in each stage of the life-cycle and the assumed global warming potential for methane. These are the key values that will determine whether study findings conclude that Tacoma LNG will mitigate or exacerbate global warming.

The nearest I have found in the DSEIS to a statement of what assumptions were used for these pivotal values occurs on page 8, Table 2.1 for GWP and on page 100, Table B.1 for fugitive emissions rate. I believe that in both cases the study authors selected erroneous values.

The discussion on page 8 attempts to justify the use of the AR4 GWP_{100} value. As anyone familiar with the *Special Report on Global Warming of 1.5 °C (SR15)*[1] issued on October 8 would understand, the need to reduce greenhouse gas emissions is near-term and urgent. This analysis should use the GWP_{20} value for fossil methane of 85 from Table 8.A.1[2] Diluting the

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[1] V. Masson et al., IPCC, 2018: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. https://www.ipcc.ch/report/sr15/

[2] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf

impact of near-term decisions by averaging them over 100 years makes no sense in the current context in which scientist tell us we may have only 12 years to drastically alter course.

The DSEIS does not state what fugitive methane emissions rate was assumed in the study. I have inferred that the values of 135.4 and 6.8 g/mmBtu, LHV shown for recovery and processing, respectively in Table B.1 where the values used, although this is unclear in the text. It is odd and puzzling that the authors present this crucial information in nonstandard and cryptic units, that aggregate leakage rate, energy content, and GWP. The units make it difficult for anyone, including scientists with relevant expertise, to determine what was assumed in the analysis or to compare the values to those presented in Table B.3, which shows some recent estimates from the scientific literature.

Table B.3 presents gas leakage in the logical and customary fashion; i.e., as a percentage of gas delivered. I note that a recent study appearing in Atmospheric Chemistry and Physics using sophisticated, on-ground, gas-detection instruments in gas fields in Northeast British Columbia found fugitive emission rates to be 2.5 times higher than the provinces estimates but was not included in the table.[3] This seems like an important omission to correct, otherwise it gives the appearance that the data were cherry-picked.

Also, missing from the discussion is any mention of the high rates of methane leakage from abandoned gas wells. There is ample empirical evidence that the gas industry has not properly capped abandoned gas wells, and I don't see that this issue has been addressed in the DSEIS life-cycle assessment. Unless there is both regulation and bonding requirements to ensure the industry has the resources to properly decommission gas wells, it seems unreasonable to assume that these emissions will not continue in the future. This fact should be included explicitly in this analysis.

Table C.2 embeds assumptions about unburned methane from using LNG in marine engines. Apparently, this flows from default assumptions within the GREET model. Yet it appears from the values in Table C.2 that it would require only a slightly larger amount of unburned methane to be released by these engines than assumed for the LNG $CO2_{equivalent}$ emissions benefit to reverse and become a liability, even using the low and incorrect GWP for methane. What assumptions were used on unburned methane, so called "methane slip" in this analysis? I infer from Table C.2, that the value was about 1.2%.

I note that methane slip is a very big issue, and that any greenhouse gas benefit from LNG may be negated by the particular engine design and combustion conditions. A recent study by the European Commission found methane slip as high as 3.6% under low-load conditions.[4] Has PSCAA evaluated TOTE's proposed engine replacements/modifications to verify that they will produce lower $CO2_{equivalent}$ emissions than with bunker fuel, and have test results been reviewed?

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[3] Emmaline Atherton, et al., *Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada*, Atmos. Chem. Phys., 17, 12405–12420, 2017 https://doi.org/10.5194/acp-17-12405-2017.

[4] *Methane emissions from LNG-powered ships higher than current marine fuel oils*, Science for Environment Policy, 28 January 2016, Issue 444. http://ec.europa.eu/environment/integration/research/newsalert/pdf/methane_emissions_from_lng_powered_ships_higher_than_current_marine_fuel_oils_444na4_en.pdf

There are tradeoffs between unburned methane, formaldehyde and NO_X emissions and efficiency that are particularly problematic in large bore engines.[5] The current documentation provides no evidence that this issue has been examined, and is likely a more problematic issue if the engines are to be retrofit for LNG rather than replaced.

The DSEIS conclusion that Tacoma LNG will reduce greenhouse emissions, even though only marginally, is clearly dependent on assumptions on which there is high uncertainty and substantial controversy. It is customary in such circumstances to perform sensitivity studies. Ecology and Environment, Inc., should be tasked with adding sensitivity studies that indicate how their key conclusion regarding greenhouse gas emissions would be affected by alternative assumptions for these uncertain parameters. Sensitivity studies should be performed to assess the impact of using the appropriate GWP_{20} values for methane and nitrous oxide, for using fugitive methane leakage rates that reflect the range of recent research findings, and for alternative assumptions on methane slip, if definitive data are not available from TOTE. The same issue applies to other future marine, rail, and highway users of LNG. PSCAA should not abrogate its authority to regulate greenhouse gas emissions by granting approval for Tacoma LNG and as a result become powerless to prevent counterproductive LNG conversions.

On page 4-13, DSEIS authors recommend that a required condition of an NOC Order of Approval be that the gas be sourced from British Columbia and that terms be included in the order to ensure that this condition is met on a continuous basis. I strongly support the intent of this recommendation, although a better solution would be to require all gas sources to be periodically tested by a credible entity, so that domestic producers see an incentive for low emission operations rather than be automatically barred from this market.

Similarly, because PSE proposes specific uses for the LNG and requests approval based on benefits resulting from those uses, an additional condition for the facility's approval should be that the LNG produced not be available for export. While fracked gas has been touted as a bridge fuel, it's actual role has been to stifle development of renewable energy. It is not in the interest of citizens of our region to have our ports used for fossil fuel commerce between Canada and other nations. Such commerce would have the effect of stifling renewable energy development in those importing countries and increasing global greenhouse gas emissions, which would in turn contribute to deteriorating air quality for the Puget Sound from forest fires and other consequences of climate change.

The Tacoma LNG project imposes risks on Tacoma and its inhabitants. The plant's tank when filled to capacity would contain the energy equivalent of 12 Hiroshima-sized nuclear bombs. This presents an accident risk as well as creating an easy target for acts of terrorism. Clearly, this facility imposes cost and risks on our community, and it should only be permitted if it also offers real benefits to our region and not just to foreign investors.

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[5] *CIMAC Position Paper, Methane and Formaldehyde Emissions of Gas Engines*, International Council on Combustion Engines, 04|2014
By CIMAC WG 17, Gas Engines
https://www.cimac.com/cms/upload/Publication_Press/WG_Publications/CIMAC_WG17_2014_Apr_Position_Methane_and_Formaldehyde_Emissions.pdf

PSE's claimed benefit of peak shaving is illusory. PSE can meet its peak needs more easily and more cheaply by simply not taking on new gas customers and deploying cost-effective gas conservation, thereby putting greenhouse gas emission from the gas sector on a controlled downward path. There are no uses for gas—residential, commercial, or industrial—that cannot be met with renewable electricity. Phasing out fossil methane is imperative if we are to meet any of our climate goals, and doing so will improve air quality, and will ensure the safety of our community, at the lowest possible cost.

The study authors were tasked with comparing Tacoma LNG only to the no-action alternative. This leaves unaddressed the question of what alternatives to bunker fuel exist for ocean shipping. Several commenters at the October 30 public hearing claimed that there were no alternatives the could clean our air and cut greenhouse gas emissions. But Tacoma LNG commits us to an unsustainable path at a time when carbon-free alternatives are close at hand.

There are several energy carriers that can be produced using renewable electricity and have the potential to replace bunker fuel in marine power systems, while clearing the air and cutting carbon emissions. These include dimethyl ether (DME), alkane blends synthesized from renewable electricity using the Fischer-Tropsch process, methanol, ammonia, and others. Deploying LNG in this unsafe location will commit us to a technology and fuel that must be curtailed if we are to preserve a livable planet. Doing so will preclude the deployment of the clean sustainable energy systems that are now or soon will be available to us as a consequence of the plummeting cost for renewable electricity.

Respectfully submitted,

Robert S. Briggs

1450-1 22. General Opposition

From: Kelly Brignell
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 10:21:35 AM

Name: Kelly Brignell
Email: resist4peace@outlook.com
Address: 1747 SW Sunset Blvd -
Portland, Oregon 97239

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is WRONG WRONG WRONG on multiple levels....
The continuation of fossil fuels at this point is nothing short of HORRIFYING AND COMPLETELY MALEVOLENT.

1451-1 22. General Opposition

From: Kelly Brignell
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:09 PM

Name: Kelly Brignell
Email: resist4peace@outlook.com
Address: 1747 SW Sunset Blvd -
Portland, Oregon 97239

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It is our duty as human beings and as Americans to heal our planet for all species. It is shameful, tragic and destructive to follow the path of fossil fuels with EVERYTHING we know about irs destruction on MULTIPLE LEVELS.

1282-1 22. General Opposition
1282-2 5. Regulatory Framework
1282-3 3. Outside of SEIS Scope

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101 November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) Tacoma, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

Carole: Thank you. The next set of five is Abby Brockway, Doug Howell, Stacy Oaks, Nancy Farrell, and Willard Westre. So, Abby Brockway is the first one up.

Abby: Sorry. I didn't get any pre-call.

[02:23:00]

Carole: Is one of you Abby Brockway?

Abby: Hi. I'm Abby Brockway, and I'm a Presbyterian. And I'm here with my friends who are there's a Mennonite, a Shaman, a United Methodist, and a Baptist. And we are here to sing a song for you. And our Jewish friend was not able to be here. It's actually not funny. And we're here because this is a moral issue. And we are here to change the air and may our breaths be the change that are needed.

[Group singing] Honoring the treaties, upholding sacred rights, honoring creation, tending all of life. Standing with Puyallup, rising everywhere, brilliant earth defenders of water, earth and air. Crying out for justice, with all we have to give, visioning the future, children's right to live. Honoring our elders, listening to our youth, guided by the wisdom of nature and of truth. Here to stop the madness, now before too late, visioning the future, for all our children's sake.

[02:24:00]

[02:25:00]

Abby: Thank you. This is a moral issue. And thank you so much for listening to us and allowing us to speak.

1735-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 5:42:46 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

While some may believe this is not an impactful project to risk the environment it is. And far too risky to weigh against future generations

Sincerely,

CL Brooke
millenium_canine@yahoo.com
98346

PSCAA PSE LNG SEIS COMMENTS-10/30/2018 Thank you for allowing this opportunity to comment. I'm employed as the Director of Risk Management for a large local employer, but am very concerned about PSE's proposed LNG refinery and its negative impacts as a resident of Pierce County.

The SEIS shows the refinery will release an unacceptable amount of global-warming pollution into the atmosphere, when the planet's best scientists are urging humanity to drastically eliminate emissions to avoid the catastrophic impacts in our lifetimes.

The SEIS uses incorrect science and fuzzy math to conceal the actual impacts of the refinery, then analyzes the global-warming impacts of the refinery 100-years from now, even though the refinery will only be in operation for 40 years. .

In order for the project to result in a reduction in greenhouse gas, PSE represents all of the fracked gas must come from British Columbia, where well and pipeline leaks may actually be up to 6 times worse than originally reported, rendering fracked gas & LNG a worse alternative to even oil or coal. These requirements are also unenforceable & contradict PSE's business model.

The SEIS is incomplete, missing actual carbon content reports from PSE, and intentionally omitted emissions sources, which could be significant, while excluding consideration of several best in class & already in use alternatives to LNG in the maritime industry.

Over the last 3 years, I've watched teams of PSE lawyers & relationship managers run circles around local and state officials. First, PSE pushed the lead agency all the way down to a public entity with zero experience with LNG. Then PSE created a selective & shoddy EIS. Then PSE sold the UTC on a different story to allow them to create a shell corporation and violate super critical terms of their monopoly agreement protecting a million Washingtonians, while walking away with $140 million in taxpayer and ratepayer money. Then PSE sent team after team of lawyers to court to seal critical safety documents from public view. During this entire time, PSE has spent $70,000 a month to maintain a sophisticated greenwashing campaign of ads, push polls, censored telephone talks & political action committees. PSE has yet to hold a meaningful public forum or have an adult conversation with the community.

I would request at a very minimum, the SEIS be updated with complete and accurate information, then reissued and re-opened for a new public comment period.

Thank you! -Phil Brooke oldbrickhousefarm@yahoo.com 253.531.3353

0715

0715-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0715-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0715-3 10. LCA Calculations
0715-4 13. LCA Inputs and Assumptions - Natural Gas Source
0715-5 7. SEPA Alternatives
0715-6 3. Outside of SEIS Scope
0715-7 22. General Opposition

RECEIVED
NOV 5 2018
Puget Sound
Clean Air Agency

From: Steve Van Slyke
To: "phil brooke"
Subject: FW: PSE LNG SEIS
Date: Wednesday, November 7, 2018 4:32:30 PM

Mr. Brooke,

I'm sorry we did not get through all of the cards for those signed up to speak at the hearing. I am forwarding this message, which includes your original e-mail message (sent to our executive director), in with the e-mails submitted as a comment on the Draft SEIS. I would also encourage you to submit any additional comments or questions you have on the Draft SEIS to our comment e-mail address (publiccomment@pscleanair.org) as the comment period is open through November 21st. As we indicated at the hearing, oral comments and written comments have equal weight. Thank you for your interest and engagement in this process.

Sincerely,
Steve

Steve Van Slyke, P.E.
Director of Compliance
Puget Sound Clean Air Agency
1904 3rd Ave., Suite 105
Seattle, WA 98101-3317

(206) 689-4052
(206) 343-7522 (fax)

SteveV@pscleanair.org

From: Craig Kenworthy
Sent: Thursday, November 1, 2018 3:09 PM
To: 'phil brooke'; Steve Van Slyke
Cc: Dorothy Walker; Eric de Place; Tarika Powell; Melissa Malott; Todd Hay; Bradley Thompson
Subject: RE: PSE LNG SEIS

Mr. Brooke,
I am forwarding your email to Steve Van Slyke, our director of compliance re your concerns on the hearing. In terms of the Advisory Council vacancies, that Council did not have and does not have any role in the SEIS process.

Craig

From: phil brooke [mailto:oldbrickhousefarm@yahoo.com]
Sent: Thursday, November 1, 2018 12:57 PM
To: Craig Kenworthy
Cc: Dorothy Walker; Eric de Place; Tarika Powell; Melissa Malott; Todd Hay; Bradley Thompson
Subject: Re: PSE LNG SEIS

Hi Director Kenworthy:

1569-1 5. Regulatory Framework

I hope this finds you well! I have a couple of concerns I wanted to bring to your attention regarding the draft SEIS process underway at the PSCAA:

First, the Tribal and Environmental Justice vacancies on the 5 member panel. This in itself could completely alter the outcome of the SEIS process.

Second, public testimony was cut off at 10 pm sharp at the Tacoma hearing on 10/30/2018, even though the panel had a stack of speakers still in hand and prior speakers weren't limited to 2 minutes (I was one who worked at 10 hour day, then sat for 4 hours in the cramped auditorium very badly wanting to speak--fossil fuel industry members were there on company time & showed up en-masse during work hours!), and there had to be at least 100 opponents still in the auditorium, many who had come from their jobs after work to testify. I've been to a few of these hearings in the past with SEPA lead agencies, and they have always always allowed an opportunity for everyone to speak who wanted to speak.

It would be wonderful to maintain the integrity of this SEIS process by allowing another public opportunity for comment, including an extension of the comment period, as well as get those 2 positions filled, so the panel reviewing this SEIS has a full body of knowledge to draw on. As you know, the power monopoly, PSE, is a very very wealthy, powerful & sophisticated organization, and these opportunities to move through the SEPA process legally and intentionally are one of the public's only tools to counter this power, money, and the green washing campaigns accompanying it.

Most sincerely and respectfully.

Phil Brooke
110 Mt. Rainier Dr.
Packwood, WA 98361
oldbrickhousefarm@yahoo.com
253.531.3353

1374-1 22. General Opposition

From: Susan Brothers Brothers
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:25:26 AM

Name: Susan Brothers Brothers
Email: susib25@gmail.com
Address: 4832 SW Wembley Place -
Beaverton, Oregon 97005

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please consider the above for the future of our planet, our children,our grandchildren and all who come after them. Science does matter.

1620-1 22. General Opposition

From: Barbara Brown
To: Public Comment
Subject: PSE LNG
Date: Thursday, October 25, 2018 9:44:56 AM

I strongly protest the proposed PSE LNG project in Tacoma.
It is utterly irresponsible and reckless to place a volatile storage project in the middle of a highly populated urban area, and on the shore of the Salish Sea.
PSE should be investing in renewable energy like solar and wind, not fracked gas.
Thank you
Barbara Brown

Sent from Barbara's Yahoo Mail on Android

2540-1 22. General Opposition
2540-2 3. Outside of SEIS Scope
2540-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2540-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2540-5 7. SEPA Alternatives
2540-6 7. SEPA Alternatives

From: akgwynne@everyactioncustom.com on behalf of Gwynne Brown
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 8:07:49 PM

Dear Responsible Official,

I strongly oppose the ongoing construction of PSE's fracked gas tank. It is too close to where people live, including people who have no choice (at the NW Detention Center), will cause pollution, will not be good for the environment, and will have negligible positive impact economically.

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Gwynne Brown
Tacoma, WA 98406
akgwynne@hotmail.com

1462-1 22. General Opposition

From: Leena Brown
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 9:54:50 AM

Name: Leena Brown
Email: leena.e.brown@gmail.com
Address: 18857 SE Sunnyside Rd -
Damascus, Oregon 97089

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Natural gas poses a huge risk to people and the environment! I urge you to think about the negative impacts of this project and how many other ways we have to safely fuel our lives. Thank you.

0652-1 22. General Opposition

RECEIVED
OCT 30 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
1904 - 3rd Ave. #105
Seattle, WA 98101

Melinda Brown Randles
204 South 5th Street
Mount Vernon, Washington 98274

29 OCT 2018 PM 3 L

Please! Say "NO" to new fossil fuel projects - like PSE's ~~proposed~~ Tacoma LNG massive fracked gas hub.

Please conduct the strongest environmental review possible, & REJECT this dirty natural gas facility.

Sincerely,
Melinda Randles
Mt. Vernon, WA

1903-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name Anne Bryant

CO_2 has a GWP value of 1 (one). Methane has a much higher GWP value. SE IS using the 2007 value of (25) for the 100 yr number. They should be using the 2016 value of (32). This makes the proposed LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

SEIS is using outdated methane global warming potential value. They didn't use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it measured against CO_2.

-over (Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Anne Bryant Email: abcounseling@pobox.com

Address: 9554 SW 62nd Dr. Portland, OR 97219

By completing this comment card you agree to receive updates about the project.

1470-1 22. General Opposition

From: Jean Bryant
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 9:46:09 PM

Name: Jean Bryant
Email: skinnybuttjean@gmail.com
Address: 4404 SE Boise St -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Noooooo fracking in our PNW . CLEAN RENEWABLE ENERGY NOW

0360-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Clint Bryson

Address or email clintbryson@gmail.com

I am in support of Building the LNG Facility which will Allow TOTE to Fuel their ships with LNG, rather than Bunker Fuel. It's been clearly demonstrated that there will be a net improvement in Air quality And reduction in harmful emissions. While I understand the desire to transfer away from fossil fuels, LNG is the best choice at this time to bridge the need as new technology is developed. I'd also like to point out that Building projects in WA state where best practices are expected + employed makes more sense than chasing industry to other areas that may not maintain such standards.

1803-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:45:11 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I am a 70 year old woman who has had aortic valve replacement, two brain aneurysms and I have asthma. Allowing fracking would harm me and others like myself, seniors, healthy and sick people including vulnerable babies and children.
When will we stand up to big Ass Oil and coal greed? When will we stop them from murdering mankind? When will we punish them for harming mankind and the planet?

No LNG -------- fracked gas makes us and the planet sick!

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Joyce Bunch

Sincerely,

Joyce Bunch
jabunch7@yahoo.com
jabunch7@yahoo.com

1280-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: sally burke
To: Public Comment
Subject: SEIS for Tacoma LNG facility
Date: Tuesday, November 20, 2018 5:05:24 PM

November 20, 2017

Dear PSCAA:

I am writing to express my profuse and far-reaching concerns with regard to the Supplemental Environment Impact Statement (SEIS) pertaining to the proposed Tacoma LNG facility.

> It ain't what you don't know that gets you into trouble.
> It's what you know for sure that just ain't so.
>
> Apocryphal Aphorism of Mark Twain

This pithy epigraph encapsulates the gravamen of the SEIS's shortcomings. The PSCAA should not grant a permit for the Tacoma LNG facility because the potential for serious environmental impacts are being swept under the rug.

I have composed this letter with no illusions. The proponent of this LNG facility, Puget Sound Energy (PSE), is owned by a multi-billion dollar foreign entity. It has filled the airwaves with pablum extolling the benefits of this project. Its sycophants are cheerleaders for the "good" life that will be ushered in with the arrival of a new LNG facility. How do I fight the pack of mendacities that PSE pumps out daily? This task is daunting. I hope that you will carefully consider the arguments delineated below and will not treat my observations as the ramblings of a nebbish curmudgeon.

For at least the last 45 years, numerous scientists have warned about the dangers of greenhouse gases. In the 1970s I remember the groundswell of effort that sought to fix the ozone problem by banning CFCs. Concerted action by many groups has ameliorated the ozone threat. Today the focus has shifted to excessive levels of carbon dioxide and methane.

Unfortunately, the SEIS contains omissions and not-so-subtle biases that undercut the efficacy of the environmental review of the methane impacts that this proposal will produce. Let me briefly identify some of the deficiencies.

First of all, in assessing the environmental effects of methane, the SEIS refers to data provided by the United Nations Intergovernmental Panel on Climate Change (IPCC). The SEIS mentions the Fourth Assessment that was published in 2007 and the Fifth Assessment that was published in 2013. [The IPCC currently is conducting a Sixth Assessment.] Curiously, the SEIS uses the "old" 2007 data and does not address why the 2013 data are inapplicable. The SEIS merely states that greenhouse gas "emissions are weighted based on the 100-year time horizon from United Nations Governmental Panel on Climate Change Fourth Assessment Report (IPCC, 2007)…." SEIS, Appendix B, p. 8. The 2007 Assessment cited by the SEIS states that the global warming potential (GWP) of methane is 25, i.e., over a 100-year period methane warms the atmosphere 25 times as much as carbon dioxide. Correspondingly, the 2013 Assessment states that the GWP of methane is 34 when one considers climate-carbon feedbacks. Unless one can provide a cogent reason for using the "old" data, the cornerstone of the SEIS analysis is

severely compromised. This is especially so since scientists historically have raised the GWP of methane as better data have become available. In using 2007 data, the SEIS appears to be putting its thumb on the scale in order to make the methane emissions of this proposed project seem less onerous.

More importantly, the SEIS blithely uses a 100-year time period to assess the effects of methane emissions. To justify the 100-year time frame, the SEIS simply states that this time frame is consistent with Washington State policy initiatives and "the long term goals of the Paris agreement." SEIS, Appendix B, p. 8. This assertion is disingenuous because a shorter time period is also consistent with environmental goals, particularly when one recognizes that methane has a half life of about a decade. In other words, the impacts of methane become less severe as one goes out in time. Thus, the use of a 100-year time frame significantly underestimates methane's negative impacts. The IPCC's 2013 report assigns methane a 20-year GWP of 86 when one considers climate-carbon feedbacks. Would the SEIS's analysis be the same if a 20-year GWP of 86 were used rather than a 100-year GWP of 25? I think not. This point is critically important because many scientists envision a "tipping point" in the next 20 years which could precipitate runaway global warming and make a 100-year time frame obsolete.

The upshot of these observations can be stated succinctly: nothing is sacrosanct about a 100-year time frame. There is no scientific reason to prefer a 100-year time horizon over a 20-year time horizon; the decision to use a 100-year period is simply a matter of convention. And convention is not a sufficient justification when the deleterious effects of methane emissions largely occur within a short time frame.

The failure of the SEIS to even mention the possibility of using a 20-year time horizon provides strong evidence that the SEIS is skewed in favor of making the statistical analysis benign. I am reminded of the quip by Disraeli that there are "lies, damned lies, and statistics." It appears that the SEIS is trying to greenwash this proposed project by using "cherry-picked" data to justify this proposed industrial project.

To be fair, the SEIS does contain a modicum of information about the impacts of methane emissions. And one can point to industry flimflam in the past that is worse. For example, the SEIS is not as one-sided as the effort by the oil industry in the 1960s and 1970s to justify the use of leaded gasoline in automobiles. In that instance, the indefatigable efforts of Dr. Clair Patterson ultimately prevailed in banning leaded gas. While I am not suggesting that the impacts of methane gas can be equated directly with the poisonous effects of leaded gasoline, I am urging the PSCAA not to settle for anything less than the use of best available science.

I now want to turn to regulatory difficulties associated with this proposed project that appear to be insoluble. The SEIS essentially states that if the proposed project uses natural gas produced in the United States, the negative environmental effects cannot be ameliorated. Hence, the SEIS proposes that the issuance of a project permit should require PSE to use natural gas from British Columbia. The SEIS cites data which

1280-1 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1280-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1280-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1280-4 13. LCA Inputs and Assumptions - Natural Gas Source

1280-4 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1280-5 13. LCA Inputs and Assumptions - Natural Gas Source
1280-6 11. LCA Inputs and Assumptions - General

claim that Canadian natural gas has a “low” leakage rate. The SEIS assumes that the leakage rate will remain fixed into the future. Alas, there is no way to verify this assumption. In this regard, several recent studies pertaining to Canadian natural gas call into question the “low emissions” thesis. See Matthew R. Johnson, et al., “Comparisons of Airborne Measurements and Inventory Estimates of Methane Emissions in the Alberta Upstream Oil and Gas Sector,” Envirn. Sci. Tech., 2017, 51 (21), pp. 13008-13017; and Daniel Zavala-Araiza et al., “Methane Emissions from Oil and Gas Production Sites in Alberta, Canada,” Elem. Sci. Anth., 2018, 6 (1), p. 27.

Obviously, one should not read too much into the analyses of just two studies. Nevertheless, the “low emissions” contention can be no more than an hypothesis. Extraction methodologies could change. Regulatory strictures could be lessened. Compliance checks could become desultory. In short, one cannot have certainty with regard to the regulatory standards or the efficacy of compliance protocols when dealing with a foreign country. Furthermore, if suspected problems arise, how does one force a foreign government to act with more diligence? Only a crackpot realist would definitely say that natural gas coming from British Columbia inevitably will be “low emissions” gas over the long haul. Thus, the SEIS might as well endorse the buying of a pig in a poke. Similarly, if the proposed project is approved with “geographic” conditions, it still will be a nontrivial exercise for regulators to identify exactly from where the natural gas is being extracted and to what extent the natural gas is being vented into the atmosphere. Monitoring possible shipping problems also could prove to be problematic.

To continue, the SEIS suffers from data omissions. SEIS makes no effort to assess the cumulative impacts of small emission sources. Also, the SEIS does not discuss the significance of the carbon content of the gas that will be used. Finally, because modern science uses statistical methodologies to assess impacts, the SEIS could be improved if, among other things, confidence intervals were used to reflect statistical uncertainties. As it stands, the SEIS gives the illusion of certainty in cranking out fixed numbers that don't reflect the imprecision of measurement techniques associated with methane data collection and the complexity of modeling methane's short and long-term impacts.

Before closing, I want to urge the PSCAA to review the proposed Tacoma LNG facility in a light that focuses on the public interest. This proposal should be analyzed in a context that goes beyond mere scientific jibber jabber. For example, I wonder about the possibility of a truck loaded with LNG getting into a traffic accident and exploding on the Tacoma freeway. I have driven the Tacoma freeway for decades and the prospect of traveling next to a large LNG truck makes me

queasy. Also, unlike Sarah Palin who, according to Tina Fey, could see Russia from her house, I really can see the proposed LNG site from my home. This proposed LNG project causes me to experience dyspepsia, because any accident could affect me directly. And let's be clear. Accidents can happen; e.g., the 2014 explosion in Plymouth, WA. However, even with this personal angst, my opposition to the PSE proposal is not based on a narrow NIMBY perspective. Many sagacious scientists have lugubriously noted that we are living at the start of the sixth great extinction event in the earth's history. [The last extinction cataclysm occurred 65 million years ago with the demise of the dinosaurs.] The dire warnings of scientists should be taken seriously. The PSCAA needs to reject any proposal that will make climate warming worse.

Although the PSCAA should undertake an exhaustive review of the latest scientific studies pertaining to methane pollution, you really don't need to look any further than the general prohibition against air contaminants that is contained within Section 9.11(a) of your regulations. PSE's current justification for their proposed LNG facility has the solidity of pure wind. You should not allow PSE to sell you a bill of goods.

Sincerely,

Sally Burke
3020 East K Street
Tacoma, WA 98404
burksal@yahoo.com

1636-1 22. General Opposition

Mahoney, Melisa

From: Dick Burkhart <dick2burk@gmail.com>
Sent: Wednesday, November 7, 2018 1:59 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dick Burkhart
4802 S Othello St
Seattle, WA 98118-3851

November 7, 2018

Dear Carole J. Cenci,

Natural gas is an extremely potent green house gas, so that life cycle leakage can often exceed it CO2 equivalent. This must be recognized in any EIS, along with the fact that the cumulative effects of global green house gas emissions are already altering our climate in ways that are increasingly damaging to human societies and ecosystems that are critical for our survival.

Dick
Dick Burkhart

0820-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

RECEIVED
NOV 9 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name MISAEL BUSTILLO-Cruz

Address or email misaelbustillo@gmail.com

COMO MIEMBRO DE LA COMUNIDAD DE TACOMA Y MIEMBRO DE IRONWORKERS LOCAL 86 QUE HA TRABAJADO EN EL PUERTO DE TACOMA, POR ESTE MIEDO ME GUSTARIA DAR MI OPINION Y SOPORTE A EL PROYECTO PARA MEJORAR EL MEDIO AMBIENTE.

*SABIENDO QUE EL PUERTO Y TODO LO QUE INVOLUCRA EL PUERTO DE TACO NO CESARA DE ESTAR COMO HANCLA Y PROMINENTE LUGAR DE FUENTE DE TRABAJO.

COMO PADRE DE DOS NENES TAMBIEN SE ME HACE MUY IMPORTANTE QUE ESTE PROYECTO SEA UNA FORMA MAS QUE ABRA UN FUTURO MEJOR PARA MIS NENES.

1984-1 23. General Support

From: Lora Butterfield
To: Public Comment
Subject: PSE LNG project letter of support
Date: Friday, November 16, 2018 6:38:09 PM
Attachments: PSE_LNG_project_support.docx

Please accept our letter of support for the PSE LNG project.

Thank you,
Lora Butterfield

Lora Butterfield | President/CEO | **Fife Milton Edgewood Chamber of Commerce**
2018 54th Ave E, Fife, WA 98424 | **Cell**: 253.878.4579 | **Office**: 253.922.9320 |
www.fmechamber.org

The Chamber
Fife • Milton • Edgewood

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

To whom it may concern:

I write on behalf of the Fife Milton Edgewood Chamber of Commerce to provide the organization's comments and to express support for the Puget Sound Clean Air Agency (PSCAA) to issue the necessary permit(s) for Puget Sound Energy (PSE) to continue construction of its liquefied natural gas (LNG) facility at the Port of Tacoma.

The Port of Tacoma is the right place for a facility such as this. The Port is an established industrial area, and this project is consistent with the types of uses and aesthetic appearance of other marine-related industrial activities in the area. In accordance with Washington's Growth Management Act, cities and towns must first study the environmental effects of, and then zone, land for industrial use in appropriate locations. The land within the Port has been reviewed by the City of Tacoma and zoned for precisely this type of industrial facility.

Port districts exist to promote economic activity and vitality. The Port has long been a substantial economic engine in Tacoma, in alignment with the purpose for which Washington laws authorize the formation of ports. The building and operation of the LNG facility represents hundreds of millions of dollars of private investment on a state-of-the-art facility. It will help local business remain competitive by providing a needed supply of LNG for its soon-to-be-reconfigured marine vessels. The siting of this facility in the Port of Tacoma, within the city of Tacoma, will be a competitive advantage for the NW Seaport Alliance and the State of Washington.

The Tacoma LNG facility will create at least 250 construction jobs and 18 permanent jobs directly within the Port, along with the economic activity from the project creating another 125 permanent jobs in the region. The facility is consistent with the on-going efforts by the Port, the City and region to encourage a healthy local business climate and help retain and grow companies who call Pierce County home. As the FEIS for the proposal demonstrated, it will also contribute millions of dollars in new tax revenues to benefit local schools, city services, and

other state and local government services by making more public funds available to meet road and public safety needs.

The environmental and health benefits of LNG are also very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

PSCAA, by preparing the draft SEIS, has confirmed the environmental benefits and overall reduction in greenhouse gas emissions which should allow the finalization of environmental review so that the project permit(s) can be issued. We fully support this project and are confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Sincerely,



Lora Butterfield, President/CEO
Fife Milton Edgewood Chamber of Commerce
(253) 922-9320

0359-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Mary Byrne

Address or email mbyrne@rosstrategic.com

The LNG permit must be denied. This is immoral and unjust. This project will disproportionately affect the most vulnerable in our community and presents an extreme threat to the health and safety of [redacted] the place we call home. This project is being pushed forward without regard for the wellbeing of Tacoma's residents by a [redacted] business that stands to gain millions. [redacted] At the very least, the SEIS must be redone with better data and evaluation models and the Puyallup Tribe must be consulted and put at the forefront of this process.

1956-1 23. General Support

From: Stephen Cadden
To: Public Comment
Subject: "Comment on SEIS for PSE LNG Facility"
Date: Tuesday, October 16, 2018 6:22:31 PM
Attachments: image001.png
image002.png
image003.png
image004.png
SEALNG Comments Pugent Sound Clean Air Agency SEIS PSE 10162018.pdf

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Dear Pugent Sound Clean Air Agency,

Please find SEA\LNG Ltd's comments on the SEIS for PSE Facility. We appreciate your acceptance or our comments on this important initiative.

Sincerely,

Stephen Cadden
Chief Operating Officer
SEA\LNG

M: +1 443 791 1948
E: stephen.cadden@sea-lng.org
www.sea-lng.org

Developing a competitive global LNG value chain for cleaner maritime shipping by 2020

SEA LNG

Pugent Sound Clean Air Agency **October 16, 2018**
1904 Third Avenue, Suite 105
Seattle, Washington 98101
Subject: "Comment on SEIS for PSE LNG Facility"

To the Puget Sound Clean Air Agency:

I am writing regarding the draft SEIS you recently released regarding the LNG facility at the Port of Tacoma and its use as a maritime fuel. I am writing as the Chief Operating Officer of SEA\LNG and this letter is being on behalf of the organization.

To begin, I would like to provide you with a brief introduction of SEA\LNG. SEA\LNG is a not for profit membership association that brings together key players from across the supply chain, including shipping companies, classification societies, ports, financial institutions, major LNG suppliers, downstream companies, infrastructure providers and OEMs (original equipment manufacturers) to address the need for cleaner shipping through the expanded use of LNG as a marine fuel.

I would like to provide some insights to the national and international importance of shipping, the maritime Industry's effort to reduce its environmental impact and the role Liquified Natural Gas (LNG) plays in helping to clean the air we all breathe. Many do not realize that roughly 90 percent of global trade is transported by ships nor that ships provide the most cost and energy efficient means of transport. Due to the scale of their carriage capacity, there is no better transport solution from an efficiency or an environmental standpoint. The maritime industry's efforts to further reduce the environmental impact of their operations has been led by the International Maritime Organization, an arm of the United Nations, and supported for years by the United States and the vast majority of countries around the world.

LNG offers the shipping industry a credible, safe, competitive and environmentally beneficial fuel. Compared to existing alternatives and other unproven technologies, LNG provides the only currently available means to address key environmental issues today. LNG far outperforms conventional marine fuels in terms of minimizing harmful local air pollution and can reduce GHG emissions. LNG emits zero Sulphur oxides (SOx) and virtually zero particulate matter (PM) and black carbon. Compared to existing heavy marine fuel oils, LNG emits 90 percent less nitrogen oxides (NOx). LNG provides major air quality benefits which are highly relevant and especially important for port communities such as Seattle and Tacoma.

Further, LNG's greenhouse gas (GHG) performance represents a step forward when compared with traditional marine fuels. Utilizing best practices and appropriate technologies can result in realistic reductions of GHG of about 20 percent with even greater potential as technologies mature and future use of renewable natural gas. As the SEIS notes, the use of LNG will "result in an overall decrease in GHG emissions in the Puget Sound Region" and "the greater the replacement with petroleum-based fuels with LNG, the greater the overall reductions in GHG emissions". Combined with the superior air quality benefits LNG is known to deliver, the proposed action is a highly beneficial step forward for the Puget Sound region.

The environmental benefits of LNG as a marine fuel are increasingly being recognized by the shipping industry, ports and port communities world-wide. Of the world's top ten bunkering ports, nine either already offer LNG bunkering or have firm plans to do so by 2020. For example, Singapore, which accounts for the biggest volume of marine fuel bunkers, is piloting LNG bunkering and has a goal of being fully LNG bunker-ready by 2020. In Rotterdam, the world's second biggest bunker port, LNG ship to ship bunkering is already available with 10 LNG bunker vessels expected to be operating there in the coming years. This progressive Port and others are also working to explore the use of renewable natural gas as part of its LNG bunkering service offering and strategy.

In the U.S., the Port of Jacksonville has pioneered LNG bunkering in support of the world's first dual-fueled container vessels which entered service in late 2015 in the trade between the U.S. and Puerto Rico. To date, these innovative and environmentally superior vessels have completed hundreds of safe bunkering operations. Other operators have made significant investments and are on track to deploy additional LNG fueled vessels and bunkering in Jacksonville in the coming months. Barge to ship, truck to ship and pipeline to ship are all operating in Jacksonville.

Many other U.S. and Canadian ports have well advanced plans to provide LNG bunkering. Vancouver is already offering LNG fueling. In addition to these individual developments, working arrangements have been set up between various international ports such as the Port of Rotterdam, Yokohama Kawasaki International Port, MPA of Singapore, Port of Vancouver, Port of Ningbo-Zhoushan and many others to collaborate on the development of LNG as a marine fuel in their respective ports.

One of the Port of Seattle's major clients, CMA-CGM of France recently announced a commitment to 9 new 22,000 TEU LNG powered vessels. The Cruise sector, important to the economy of the Pacific Northwest has firmly embraced LNG as a fuel of the immediate future. The Port of Tacoma is heavily committed to the International automobile market and indications are that future new builds of Roll on Roll off vessels will also embrace LNG as a clean safe, environmentally superior fuel.

Without an LNG fuel source for these maritime vessels, air pollution issues will continue to impact the health of the region's citizens, and important Port business opportunities will be missed to the detriment and loss of high paying and important jobs throughout the community. Seattle and Tacoma have a significant opportunity to be among some of the world' best ports and to offer their key stakeholders the environmental benefits that LNG can bring today.

Thank you for your time and energy to review this important matter.

Sincerely,

Stephen Cadden
Chief Operating Officer
SEA\LNG, Ltd.

Steve: Thanks. Next up is Joy Caddock.

Joy: Joy Caddock. I'm Joy. And I grew up in this area on Puyallup land. And I've benefited from the love and the care that they've given this place. I pulled crab traps with my grandma, until she was 88. My brothers and I crabbed as well. And we grew up on Colvos Passage. My dad would yank us out of school to go see the orca pods go by and see how big their eyes are and how wonderful these creatures are.

[05:55:00] I went to Western Bellingham for school, and I was present in town, when those three boys were killed, in the Olympic pipeline explosion that devastated Whatcom Creek. I was outside in a field, when it happened, and I saw a big plume rise about 5 miles away looming large. The air was thick and not breathable. I chose to make my home here 12 years ago, and it was a gut feeling, and I wasn't wrong. I love it here. I work on an organic farm in Puyallup and spend my time in the shadow of our epic and living mountain. I'm proud to raise my kid, Shell, here. He's 4.

He's seen whales in his young life and had the privilege to breathe clean water and air. He'll be 16 in 12 years. So, the deadline for transitioning is coming up. I'm worried. I'm worried what the world is going to be like for him. So, when I was preparing for this, I realized that the SEIS and the project itself were just dissolving in my hands in ifs.

[05:56:00] There's like if we measure the global warming potential at 100 years, if we use data that's over 10 years outdated, if we get the gas from BC exclusively, if we use data from this one BC fracking site that's potentially underreported, if we don't have an overdue earthquake, if that earthquake doesn't cause liquefaction in the plant because it's on infill, if our expectant mountain doesn't erupt, if there aren't unforeseen leaks. It goes on and on and on. I know some things that are, and those are the things I mentioned in the beginning. And I'm not willing to change the things that are for those ifs.

And won't waste 12 years we have to transfer to renewable energy, if it's all ifs. I will not trade something I have, our lovely alien home for ifs.

[05:57:02] Please stand by your commitment to defend our future. Tell us what's in our air, and be good and wise stewards of our home. Please either deny the air permit or submit an accurate SEIS, based

1161-3 22. General Opposition
1161-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1161-3 5. Regulatory Framework

on the most current data that reflects the more applicable potency of methane at 20 years. And when you do this, I urge you to involve the Puyallup Tribe, as their input is paramount, and fill those vacant seats that Carlo mentioned, on the panel. Thanks very much.

From: Joy Caddock
To: Public Comment
Subject: Please deny PSE"s LNG air permit
Date: Tuesday, November 20, 2018 10:39:59 PM

Members of PSCAA,

To start, I appreciate we are on Puyallup land as we decide things that their nation is adamantly opposed to. Even just this reason should help you decide to deny the permit. They should be meaningfully consulted.

Most recent UN climate report put together by the intergovernmental Panel on Climate Change and hundreds of climate scientist say that in 2030, 12 years from now is a critical deadline to make "rapid and far-reaching changes" in order to keep global sea levels from rising and ensuring a more sustainable and equitable society.

These rapid transitions need to happen in land, energy, industry, buildings, transport and in habitual and perceptual changes about our society. Global net human-caused emissions of Carbon Dioxide would need to fall by about 45%---reaching net-zero by around 2050. Methane (LNG) would need to fall faster than that because it's even more effective at trapping heat than Co2. We don't have time for LNG. We should be spending these next 12 years changing course.

Co-chair of the IPCC, Jim Skea says, "limiting warming to 1.5 degrees Celsius is possible within the laws of chemistry and physics, but doing so would require unprecedented changes." Another co-chair, Debra Roberts says, **"This report gives policy makers and practitioners information they need to make decisions and tackle climate change while considering local context and people's needs. The next few years are probably the most important in our history."**

Which brings us to this moment in time in my dear Tacoma. My son took his first breath here, in a house that was built in 1896 by Weyerhaeuser. About 50 years before that house was built the first mill was built, establishing Tacoma as a logging town. The industry stuck and the Salish Sea was lost to greed. Such a beautiful place in the shadow of the mountain used so transactionally. But I wonder what the air was like then before so much industry had destroyed it's quality. I wonder what the water was like---so related to the air, I bet it was teaming with everything living. Orcas, Salmon, starfish. I've been in this area 40 years and I can see a drastic change. The wisdom of the Puyallup and Nisqually Nations was what helped keep this land so balanced.

This moment in time gives me a feeling of panic as I read these reports and try each day to make a life and future for my 4 year old. He'll be 16 in 12 years. I want him to have the best chance possible of seeing Orcas, breathing fresh air, drinking fresh water and not getting killed or injured by dangerous port projects. You know, what most mother's dream. I work on a farm in Puyallup near Chief Leschi School and Riverside Elementary and the most recent scrap metal yard fire was so toxic to us---more toxic still to the people detained at NWDC. There were no precautions taken within the facility. My throat was sore for a week after and since

1610-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

I'm working there I'm more susceptible to colds and sinus infections. That air is already heavy with pollutants, adding a heavy hitter of a pollutant like methane into the mix that has a global warming potential of 96 times that of Carbon Dioxide at 20 years is suicide.

I urge you to please consider the most recent data on methane put out by the IPCC and develop another SEIS that reflects a time period closer to that 12 year period. That is a true cost calculation of air quality. Please don't waste the time we have to correct our course by letting a project go through that we have no possible way to come back from.

Thanks for your time and consideration,

Joy Caddock
817 N. I St.
Tacoma, WA
98403
253.970.3018

Steve: Thank you.

[06:17:00] So, the next group of names I'll call up here. Caitlin Calnan, Andy Wopler, Todd Mitchell, and Sarah Smith. So, Caitlin Calnan?

Caitlin: Good evening. My name is Caitlyn Calnan. I actually grew up down in Olympia, and I grew up driving through Tacoma all of the time. I never had the desire or want to grow up here, but I did make the move here four years ago for my career. and I've grown to love Tacoma, to embrace it. I'm excited to grow roots here and, eventually, grow a family here. And I'm here to add my voice to support for TOTE Maritime's conversion to LNG. I'd strongly urge the Air Agency to issue the required air permit to continue to document the environmental benefits.

This project did start under President Obama's EPA and has undergone the following independent environmental reviews, which speak for themselves. The Department of Transportation, the US Army Corps of Engineers, the US Coast Guard, National Marine Fishery Service, the list goes on from the Port of Tacoma to the Washington Department of Fish and Wildlife, the Washington Department of Ecology.

[06:18:06] The list goes on. All in all, what this data says to me and what do these studies conclude? Well, 1) building LNG facility is not only safe, but it's great for the environment. 2) LNG is a cleaner fuel than diesel. And 3) it concludes that that TOTE's conversion to LNG will reduce greenhouse gases by a lot, by 13.5%. I think this project has been poked, prodded, analyzed, and re-analyzed to death. As a resident here, I would encourage and strongly encourage the Air Agency to stay true to your mission. Stay to the science. Stay to the data, the facts and issue the air permit. I think there's a lot of emotion and a lot of opinions in the room.

So, again, I do encourage you to stay to the facts. And we'll never save this planet from climate change, unless we take major steps like TOTE's conversation to LNG. Thank you.

1648-1 3. Outside of SEIS Scope
1648-2 10. LCA Calculations
1648-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1648-4 13. LCA Inputs and Assumptions - Natural Gas Source
1648-5 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1648-6 5. Regulatory Framework

From: Alexa Camilleri
To: Public Comment
Subject: Public Comment: Fracking in Tacoma
Date: Monday, October 29, 2018 8:12:51 AM

Pugent Sound Clean Air Agency,

Fracking comes with a host of adverse health and environmental effects including (but not limited to) contamination of the groundwater, methane pollution (which contributes to climate change), air pollution, toxic chemical exposure, gas explosions, water shortages, and fracking-induced earthquakes. Fracking companies have tried to silence those who point out the harmfulness of the fracking process for a long time. Thousands of people will be in the refinery's "blast zone" and will suffer tremendous negative health effects. Even low exposure to the chemicals involved in fracking can harm the extremely sensitive endocrine system.

In addition, the draft Supplemental Environmental Impact Statement (SEIS) is incomplete and does not include all the data to successfully assess the impact of a LNG facility in the area. The draft should be completed, re-issued, and reopened to public comment. The SEIS is also using outdated Global Warming Potential (GWP) values for methane from 2007 instead of the 2016 numbers, making the LNG plant dirtier from an emissions perspective than staying with oil. All of the analysis on this facility uses the 100 year values for GWP emissions, but a recent report stated that we must change our energy fuel mix in the next 20 years or face catastrophic consequences. According to 350 Tacoma "using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability." The draft also claimed that fracked gas from British Columbia has low leakage rates, but recent analyses show that fracking facilities tend to underreport their leakage rates, suggesting that the SEIS claim is questionable and needs further study. Furthermore, the analysis left out emissions data for diesel trucks that will need to be used for the transportation of water and sand necessary for fracking. All these points suggest that the SEIS draft is unfit to be taken at face value as an environmental assessment, as it leaves out vital information and ignores current science.

Lastly, I stand with the Puyallup tribe, whose treaty rights must be honored. Too long has this country ignored the treaties it has made with indigenous tribes, always to the detriment of the tribes' health and culture. The Puyallup people are closely tied to the Salish Sea, especially to the salmon they make their living on, which stands to become heavily polluted if a fracking refinery is built. The Treaty of Medicine Creek granted 2.24 million acres of land to the Puyallup and others in addition to protecting their fishing rights. As of 1974, the tribes named in that treaty were recognized as having the right to half of all fish caught on traditional lands. The LNG refinery that is being proposed sits directly on land legally owned by the Puyallup people and therefore cannot be built without the tribe's input.

Best,
Alexa Camilleri

2244-1 10. LCA Calculations
2244-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2244-3 10. LCA Calculations
2244-4 13. LCA Inputs and Assumptions - Natural Gas Source
2244-5 11. LCA Inputs and Assumptions - General

From: Cynthia Cannon
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 6:56:21 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS. It concerns me that, on one hand, the construction is already underway and, on the other hand, we haven't satisfactorily addressed critical elements of this project – not the least of which is whether the LNG approach proposed will actually reduce greenhouse gases.

I am a Tacoma resident concerned about climate change and our contributions to global warming. I'm also concerned about contributing to LNG demand and burgeoning hydraulic fracturing with its attendant ground water contamination and earthquakes.

Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment. While LNG is couched in terms of a 'bridge fuel' – it may be that the bridge is too short to be a true step away from 'dirty fossil fuels'.

After reading the SEIS, it appears to use old information, and it is missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from British Columbia? And, is this an effort to keep the damages from fracking "not in our backyard?" If so, this is a short-sighted approach to environmental stewardship. The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network – increasing demand for fracking and the attendant environmental damage in our nation.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Thank you.

Cynthia Cannon
cj.cannon@comcast.net
5346 Broad View Ave NE
Tacoma, Washington 98422-1834

1378-1 22. General Opposition

From: Cigdem Capan
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 7:47:21 PM

Name: Cigdem Capan
Email: capancigdem@gmail.com
Address: 1701 Gray St -
Richland, Washington 99352

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

If the methane is accidentally released in the air, there is no way to recapture it and it is a greenhouse gas much stronger than carbon dioxide. We cannot risk polluting the air when there is no remedy available for clean-up. The location of this plant, next to superfund site and so close to residential area, is also a big concern, especially in case of fire. I strongly oppose the construction of this plant.

1679-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:26:38 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities. This is a terrible and toxic idea. Please do better.

Sincerely,

Rachel Carey
rkatzcarey@gmail.com
98117

1619-1 3. Outside of SEIS Scope

From: Cheri Carlson
To: Public Comment
Subject: PSE LNG
Date: Wednesday, November 21, 2018 4:07:26 PM

Hello!

I did not make it to public comment on Oct 30.
28 years before, Oct 30 was also on a Tuesday, the Tuesday my life changed forever.
That morn I woke to my infant daughter deceased of SIDS.

Since that time I had a son, a young man plagued with respiratory issues.
I was going to show up and speak with you Oct 30 about Clean Air - and how I don't want to bury another child.

I was also going to approach the subject of "as above, so below", what affects our air also affects our water.
And as you know, our bodies are comprised of roughly 70% water. Literally, Water Is Life.
Everything on Mother is connected. We must consider impacts to the Big picture. If I thought the Big Picture would benefit from LNG I would accept the risks of living near a Plant that will annihilate me if there is an earthquake or storm big enough to cause power outage and explosion from lack of cooling. The fact this is being considered on a fault line in a lahar zone and residential area continues to astound me. Is there no common sense left?! At any rate, I see no reason to prepare for earthquakes as I am in the blast zone and will not need supplies.
Since there is no global benefit I wonder why we are being exposed to the risks?

I am not always tearful about my daughter - but as I processed what I would say to you that day I found myself unable to think or speak without tears. Had I made it there I doubt I could have relayed much beyond the tears.
If you want to get that full impact, just consider a short older woman with tears streaming and a big lump in her throat, perhaps enough heartbreak that others including you would have felt tears welling up.
Just be grateful I didn't do that to you!

And Please, Please, Please, Do The Right Thing and consider All the impacts
Thank You
Cheri Carlson

Sent from Outlook

1384-1 22. General Opposition

From: Darlene Carlson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:18 PM

Name: Darlene Carlson
Email: darcarlson@comcast.net
Address: 2722 SE 21st Avenue -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Energy Agency,
Thank you for allowing citizens another look at the Puget Sound Fracked Gas Project. As someone who has been actively engaged in environmental issues since reading an article on air pollution in Newsweek in 1968, I know well the need to move toward clean, renewable, energy. Continuing down the fossil fuel path is insanity in action. What else do we need to see to convince us that abating climate change should be out top priority?

I have children and grandchildren who are inheriting the the mess we have created by ignoring the facts and bowing to the profiteers who make millions on the backs of all living creatures.

Do not move forward with a report that is flawed as your basis of truth. Use the best data available, bravely speak the truth, and spare further degradation of planet earth --not to mention the ocean and coastline of the beautiful coastal sound you are responsible for.

Sincerely,
Darlene Carlson

1393-1 22. General Opposition

From: Darlene Carlson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:06 PM

Name: Darlene Carlson
Email: darcarlson@comcast.net
Address: 2722 SE 21st Avenue -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Energy Agency,
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Sincerely,
Darlene Carlson

1405-1 22. General Opposition

From: Darlene Carlson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:55 PM

Name: Darlene Carlson
Email: darcarlson@comcast.net
Address: 2722 SE 21st Avenue -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

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Sincerely,
Darlene Carlson

1424-1 22. General Opposition

From: Darlene Carlson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:40 PM

Name: Darlene Carlson
Email: darcarlson@comcast.net
Address: 2722 SE 21st Avenue -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

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Sincerely,
Darlene Carlson

1430-1 22. General Opposition

From: Darlene Carlson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 8:53:41 AM

Name: Darlene Carlson
Email: darcarlson@comcast.net
Address: 2722 SE 21st Avenue -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

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Sincerely,
Darlene Carlson

1331-1 7. SEPA Alternatives
1331-2 18. LCA Inputs and Assumptions - Marine Diesel Oil

From: John Carlton
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 6:53:41 PM

November 21, 2018

Dear PSCAA,

I have been following this project for over three years now, and appreciate the efforts of PSCAA to evaluate the GHG emissions of its upstream and downstream sources via an SEIS. There are many problems with this facility: violation of indigenous people's treaty rights, potentially catastrophic risks, inadequate public notification, unfair public financial costs, corrupt tax breaks, local toxic refinery emissions, the environmental effects of fracking, (to name a few) but I will focus my questions on the GHG problem, which is the focus of the SEIS.

The first thing that I would like to address is: shouldn't the "no action alternative" analysis include more than just comparing LNG with just bunker diesel? Why no mention of electric or other alternative fuel options? Note: WA state ferries were targeted as being PSE LNG powered by this facility (noted in the FEIS) but have since been determined to go electric instead. Should not alternative fuels have been also compared, as this is being analyzed for effects over a forty year period? Electricity will surely become a greater source of power in the very near future in the shipping industry. And other sources of power, like ethanol, hydrogen, electric, wind, etc. These should have also been a part of the comparison. Please, incorporate these fuels in the comparison.

In regards to bunker diesel: what about cleaner diesel, like ultra light diesel or low sulfur diesel? It seems that comparing LNG use with diesel needs to be more carefully parsed out. Why were current diesel standards the sole comparison, especially over 40 years? To limit the comparison of GHG emissions solely to current worst case diesel standards while assuming best case methane leak containment (via Canadian gas) is not a fair comparison. What if the diesel was used via more controlled methods of "scrubbing"? What about other sources for diesel?

Which leads me to: what if Canada lowers emission containment standards (like the EPA just did in the USA)? Shouldn't there be higher, more controlled standards than just the vagueness of future Canadian fracking regs? Why limit the methane to be solely from Canada? Aren't there even better, less GHG leaking methods of gathering methane than Canadian fracking? Also, why do you accept the assertion that natural gas from BC is cleaner? Is this rooted in scientific evidence or based on self-reports from industry? "According to Natural Resources Canada, about 50 percent of Canadian gas was derived from fracking in 2014, and the figure is expected to increase to 80 percent by 2035." (Powell, Tarika. Is Your "Natural" Gas Actually Fracked? Sightline Institute. Web. 30 October 2017. www.sightline.org.)

LNG "hybrid" powered ships will still use diesel… what if it becomes price beneficial for the shipping industry to burn more diesel, less gas? They are not required to use the lng produced at this facility, so if they do not the GHG cost of the extraction, piping and refining will be in addition to the diesel. What are the GHG emissions that will be created as a result of the LNG not being used but still acquired and potentially sold for other uses?

1331-3 17. LCA Inputs and Assumptions - Peak Shaving
1331-4 12. LCA Inputs and Assumptions - Global Warming Potential Value

What about GHG emissions from catastrophic accidents, like the pipeline explosion on BC last month. Shouldn't events like that be analyzed and included in the study?

PSE has stated that the use of "peak shaving" gas from this facility will be used not only for residential gas customers, but also as a fuel to generate electricity. Should not there have been a comparison of other methods of generating electricity, like sustainable sources like wind, solar, tidal, etc.? Methane is not the only way to generate electricity. Other methods should have been compared in the analysis, no?

Building the facility in Tacoma will (and has already) incorporated the use of large amounts of sand, concrete and steel. What are the GHG costs of this construction? Also, GHG emissions will be produced in the fracking process itself, not only via leaks, but also via the construction, production and maintenance of the site. Those emissions were not a part of the SEIS analysis and should be.

The SEIS analyzed the facility as producing 250,000 gallons of LNG per day, but the FEIS states clearly that PSE intends to produce up to 500,000 gallons per day. The SEIS should take this into account.

Also, a relatively small portion of the LNG is likely to be used for ship bunker fuel and peak shaving. PSE intends to tanker truck, pipe and (potentially) tanker rail it out for other uses, which cannot be compared to diesel GHG emissions, as methane may be used as a fuel in production for many things, not just diesel powered industry. LNG has become a fuel for vehicles . (An LNG gas station for vehicles recently opened in Fife.) Yet, electricity is already a fuel for automobiles and trucks. The GHG cost of this facility should also consider its use as a vehicle fuel, replacing not just diesel, but gasoline and electricity. Also, the FEIS of this project states that it intends to fuel locomotives, but no analysis of how that would compare with other energy sources (like electricity) are considered.

LNG has become a valuable export commodity and it is being shipped overseas, burning fuel to distribute it. What would the GHG effect be if LNG is exported from this facility? The Trump administration has made it clear they intend to beef up its "energy dominance" agenda by fast-tracking the permitting of small-scale liquefied natural gas exports. Despite PSE's claim that they do not intend to export it, if the feds give them the green light, this may well become the way this LNG is being used. Shouldn't the SEIS consider the other possible uses of LNG than just bunker fuel and peak shaving?

My final point and question is this: The SEIS compares GHG emissions of LNG vs. diesel over a hundred year period, but the effects of GHG as methane are much worse in the short term. We are facing the tragic effects of GHG emissions NOW, not just in 100 years. Why did the SEIS analysis not weigh the IMMEDIATE effect of this LNG facility on GHG emissions? I think for this reason alone the SEIS needs substantial re-analysis.

Thank you,
John Carlton
Tacoma Resident

Carole: Thank you. Cathy Carruthers? Lloyd Madden?

Cathy: Hi. I'm Cathy Carruthers.

Carole: Oh, I'm sorry. I can't see back there.

Cathy: It's squealing when I talk. Can we stop the squeal, or should I just keep going? I'm losing my time. The LNG plant permit does not preclude uses beyond the diesel displacement and heating. It, therefore, will increase total natural gas use, in this area. The LNG plant can actually generate more throughput than your estimated calculations.

[02:53:00] That means that, in addition to the numbers that have been suggested by environmentalists, you need to increase the amount of natural gas throughput. Second, a mini split heat pump is more cost effective than natural gas. As people discover this, the winter demand for natural gas will decline, creating more excess throughput, which could be used for exports. What the first two points mean is the LNG plant will, eventually, have sufficient natural gas to sell for use beyond the current stated uses. It will, therefore, increase greenhouse gases generated by exporting LNG.

Please revise your GHG estimates based on the maximum throughput. Please revise the job estimates based on job loss from exporting LNG outside of the United States.

[02:54:00] Thank you.

1765-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:05:49 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Please .

Sincerely,

Erin Castle
huntleycastle@comcast.net
98007

1713-1 5. Regulatory Framework
1713-2 3. Outside of SEIS Scope
1713-3 3. Outside of SEIS Scope
1713-4 3. Outside of SEIS Scope
1713-5 3. Outside of SEIS Scope
1713-6 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 5:24:24 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

These are the many reasons I oppose the LNG Plant in Tacoma:

1. The Puyallup Tribe has not given its consent to PSE's project and has filed lawsuits against its construction, based on its significant threat to Treaty-protected fishing rights, and has subsequently garnered significant and broad support from both local community members and the Affiliated Tribes of Northwest Indians.

2. Reducing pollution from greenhouse gases is a critical policy objective of the State of Washington and Governor Inslee has affirmed his commitment to supporting the Paris Climate Accords.

3. Natural gas is now recognized as a powerful contributor to climate change, peer-reviewed studies having overwhelmingly found that emissions from fracking, and leaks along the supply chain effectively override the otherwise lesser environmental impacts of gas usage.

4. The PSE plant would require an ongoing supply of fracked gas from offsite wells, exposing communities near those wells to deadly toxins and carcinogens used in the fracking process, and to permanent pollution of their local waters.

5. The proposed plant includes an 8 million gallon LNG storage tank, equivalent of 4.8 billion gallons of natural gas in vapor form, with catastrophic explosive potential in a metropolitan area.

6. Siting of the facility in the Cascadia fault zone, a region at high risk of earthquakes and tsunamis, and in an area that will be regularly flooded by 2050 due to sea-level rise and seasonal inundation, would pose an extreme and unacceptable hazard to local residents.

7. The facility is sited adjacent to EPA Superfund sites and overlaps a Washington Department of Ecology Hazardous site, exposing thousands of people within a 3-mile radius to toxins and carcinogens during construction, in violation of federal law, leading to an increased risk of cancer, neurological disorders, birth defects, respiratory issues and other chronic health issues.

Sincerely,

Teresa Catford
teresacatford@gmail.com
98177

1354-1 22. General Opposition

From: Ava Chaloff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 2:47:02 PM

Name: Ava Chaloff
Email: avachlff98@gmail.com
Address: 1574 Coburg Rd., PMB #173 -
Eugene, Oregon 97401

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Friends at Puget Sound Energy: I believe your environmental impact statement only refers to the Co2 emissions produced by the extraction and transportation of fracked liquid natural gas. As anyone can understand, these two steps are only the first in a string of developments that have a very bad impact on the environment. When we start trying to balance our trade bottom line with Asian or other countries that would purchase this LNG, we imply that conversion to green energy can still be left to some vague future, and the green energy systems that these countries can begin creating can also be put off-at least until all nations have made as much money from fracked products as possible. I believe that we must start the ambitious conversion right now, and I'm sure there are many others here in the North West who feel the same.

1449-1 22. General Opposition

From: Ava Chaloff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 12:01:11 PM

Name: Ava Chaloff
Email: avachlff98@gmail.com
Address: 773 J St -
Springfield, Oregon 97477

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

PSCAA: I am writing as a privileged member of the Pacific North West where we haven't yet had to suffer the full impact of hurricanes, deluges, typhoons and other catastrophes that have struck other parts of the nation and areas of the world. We DO have an introduction to drought that may extend into the indefinite future, and along with California, the prolonged, more active fire season which has destroyed property and made our forested areas less like paradise than they used to seem. Please do not put a good for business spin on your SEIS for a fossil fuel exporting terminal because our life in this region is still relatively good. Please consider all of us living in this great region.

1846-1 22. General Opposition

From: Janet Chalupnik
To: Public Comment
Subject: Tacoma LNG
Date: Monday, November 5, 2018 4:31:42 PM

I am opposed to the Tacoma LNG project because it is imperative that we reduce our dependence on fossil fuels.
Thank you for the opportunity to comment.

Janet Chalupnik
Edmonds WA.

1549-1 22. General Opposition

From: Becky Chaney
To: Public Comment
Subject: Comment opposing the Tacoma LNG Plant
Date: Tuesday, November 20, 2018 6:48:07 PM

Dear Puget Sound Clean Air,
Having read the Coalition Letter to PSCAA (signed by Todd Hay, 350 Tacoma and many other local concerned citizens and organizations), I am very concerned that PSCAA may be using outdated and inappropriate science in its Supplemental Environmental Impact Statement (SEIS) for greenhouse gas emission for the Puget Sound Energy liquefied natural gas facility in the Port of Tacoma.

At this time, when we know that the consequences of global warming are dire, it is essential to use the most current science when evaluating potential new infrastructure. I urge PSCAA to address the technical concerns raised in the letter noted above. Additionally, I urge PSCAA to ensure that a revised and reissued update of the SEIS that is consistent, includes all relevant data, and uses correct units of measure be publically posted with adequate time for review and a new period for public comment.

Thank you,
Rebecca Chaney

r.a.c. Pacific Northwest Environmental Design
425.880.4220 - 5802 298th Ave NE Carnation WA 98014
becky@chaney.org

Carole: Thank you, Ms. Shimeall. Chris Chapin.

Chris: Hello. My name is Chris Chapin. Thank you for holding the hearing today and taking the time to listen to us. I'm a resident of Redman, Washington, and I'm an athlete. I go out into the mountains every single weekend. I'm a skier. I'm a hiker. I'm a camper. I'm a rock climber. And I see the impact that putting more carbon into the atmosphere, putting more methane into the atmosphere is having on our mountains here in Washington.

[00:12:00] Think about when you were a child, and you went to the playground. You probably had a good time. You probably had a lot of fun. I'm 37 years old. I'm still a child. Every weekend, I go out into my playground, into the mountains. And what we experienced this August, record levels of smoke, it's not new, right. It happened the year before that, the year before that. It's happened the last five years. I'm losing my playground. We're all going to lose our playground, if we don't stop putting pollution from burning fossil fuels into the atmosphere.

We've reached a point, in civilization, where we can power everybody's home with clean, renewable energy, with solar panels, with wind, with hydro. The fact that we're even having a discussion about burning more fossil fuels and putting more pollution into the air is outrageous to me.

[00:13:00] We don't need to do that anymore. I'm glad you came up with this plan, and you want to see some profits from it. I'm glad it's moving a lot on the right timeline. But we have new information just released two weeks ago that we've got 10 years before climate catastrophe. So, it's time to table these plans and think about how we can preserve our playground, how we can keep going outside, enjoying our life because, if we don't, you know what you can do with all of that money that we make out of it?

Yeah, you can wipe your tush with it because that's about all it's going to be good for. I appreciate your time. Thank you.

Carole: Thank you. So, the next group of five is Councilmember Annette Bryan, Lou Paulsen, Erin Dilworth, Jason Hagey, and Bill Adams.

1753-1 11. LCA Inputs and Assumptions - General

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 10:50:18 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
I do not believe that the LNG facility is in this state's best interest and cannot condone its contribution to climate change that will have major negative effects on all of us.

Sincerely,

Hannah ChapmanDutton
hannahpointe@yahoo.com
99202

1813-1 5. Regulatory Framework

From: Frank charles
To: Public Comment
Subject: Request to speak at the Public Hearing about PSE's Tacoma LNG Plant
Date: Sunday, October 28, 2018 6:49:06 PM

I am a life-long resident in the Puget Sound Area. I am an Energy Engineer so I can provide interesting details on the plant. I would like to speak at the 2:00 PM session October 30 at the Rialto Theater.

Please call or e-mail if there are any question for me.

Thank You.

Frank C. Leyritz
Aviation Consultancy, LLC
-
Member, American Institute of
Aeronautics and Astronautics
-
e-mail frank.leyritz@gmail.com
Mobil 206.457.9201
Sent from iPhone

1976-1 23. General Support

From: Frank charles
To: Public Comment
Subject: My Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 1, 2018 10:51:47 PM
Attachments: Frank Leyritz"s Letter of support to the Puget Sound Clean Air Agency, November 1, 2018.docx

Please find attached my statement on DSEIS, PSE LNG Project.

Thank You.

Frank C. Leyritz
e-mail: frank.leyritz@gmail.com
Mobil: 206.457.9201

Puget Sound Clean Air Agency - PSCAA
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

As a life-long resident of the Puget Sound area, with an energy engineering background, I am supporting PSE'S LNG facility at the Port of Tacoma.

As To The Comments Against the Project That I Heard At The Public Hearing at the Rialto Theater on October 30, 2018:

In my opinion most of the opinions against the project were not based on science or energy engineering principles. As an example:

I. Several people used the 'firecracker' analogy that the LNG facility that it could explode like a gigantic firecracker, putting residents living near the Tacoma Waterfront in fear the LNG plant exploding like a nuclear bomb. Science tell us that is physically impossible.

II. The gentleman that spoke from the very back of the theater, claimed LNG causes Tuberculosis is an incorrect statement. The opinions from organizations such as the Mayo Clinic (https: //www. mayoclinic.org/diseases-conditions/tuberculosis/causes state that the bacteria that the cause of tuberculosis are spread from one person to another through tiny droplets released into the air via coughs and sneezes, and not from the presence and usage of LNG.

III. The opposing opinion that natural gas sourced from Canada via the fracking process will be dangerous to people living in the Tacoma and the Puget Sound region is not factual. Using the fracking process has been approved by many government agencies, as a safe natural gas. The small amount of natural gas sourced from Canada with traces of natural gas created by the fracking process will not have any significant impact when burned by ships, trucks, and busses using LNG as the fuel source.

IV. I recall only one person speaking against the project having any engineering degree (but not a degree in energy sciences).

V. Since the many permitting agencies have approved the many stages of the LNG projects construction, it seems to me that those experts have determined this is a very safe facility.

VI. In closing, from my performing due diligence for published data on any dangers of LNG, e.g. Risk Factor of Liquefied Natural Gas, https:// www. Researchgate .net, I could not locate supporting data to back up opposing the LNG facility listed.

Benefits of Puget Sound Energy's Tacoma LNG Facility:

In my opinion, the major benefits this facility will provide, **to all of us**, will be:

1. It will provide PSE's residential and commercial customers with natural gas reserves to assure us an adequate natural gas supply **in case of a major emergency.**

This is significant due to the recent natural gas pipeline explosion in British Columbia and resulting pipeline shut down, which impacted the Northwest Region, in mid. October, of this year. Utilizing e-mail and local media, PSE asked customers to temporarily reduce hot water usage and lower furnace thermostat temperature settings to conserve natural gas supplies.

If the rupture would have occurred in very cold weather, like January or February, this would have been a major impact to our personal comfort; and may require businesses with high natural gas usage to reduce their usage or possibly suspend operations.

The British Columbia pipeline and other natural-gas pipelines serving PSE, are always vulnerable to interruptions. Hence, **natural gas reserves are very important**.

2. The Tacoma facility will provide local transportation companies, like TOTE Maritime's Alaska cargo vessels, with a significantly cleaner fuel alternative. We will have the cleanest shipping fleet on the West Coast.

3. Reduces the risk of cargo ship's diesel or bunker fuel spillage in both Commencement Bay and in Puget Sound, particularly during ship refueling.

4. We all wish for cleaner air and water here in the Northwest for ours and our family's health.

LNG significantly reduces:

- Virtually all particulate emissions from the many ships traveling through Puget Sound. By switching to LNG fuel, we can reduce 85% of harmful particulate emissions.

- Reduces Green House Gases by 15%.

- Reduces Sulfur dioxide emissions by over 99%.

- And reduces Nitrogen oxide emissions by nearly 85%.

These pollutants also impact marine life

5. Since the use of LNG is forecasted to increase, the Tacoma facility will meet the new needs of LNG powered trucks, busses, and hopefully cruise ships in the near future.

To me, this is a, 'What came first, the chicken or the egg' example. If there is an LNG facility, LNG usage will increase, since there is a refueling facility close by to serve new LNG customers more LNG vehicles come to the Puget Sound region.

6. PSE's LNG facility will create 125 permanent, well paying, full-time employment positions.

7. PSE's LNG facility will help local employers like TOTE remain competitive in the Northwest. LNG users may pay lower emission taxes and fees and face lower costs of meeting emission regulations.

8. LNG usage is not new technology. The LNG industry has had an exceptional safety record for the past 50 years. PSE has safely operated the LNG facility in Gig Harbor for nearly 14 years, without an incident.

9. Many of the speakers in favor of the LNG Facility were business people and well recognized local organizations, and not owned by PSE, spoke about the many advantages of the facility and what it meant to them.

10. My last item: From the positive facts I heard at the Public Hearing, I believe the risks are minute small vs. **all the advantages of LNG**. We travel in cars and airliners, feeling safe, **knowing the risks are also very small.**

Thank You

Frank C. Leyritz
e-mail frank.leyritz@gmail.com
Mobil 206.457.9201

1998-1 23. General Support

From: Frank charles
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 2, 2018 6:36:11 PM
Attachments: Frank Leyritz"s Letter of support to the Puget Sound Clean Air Agency November 2, 2018.docx

Please find attached my November 2, 2018 Letter of Support for PSE's LNG Facility in Tacoma.

Thank You.

Frank C. Leyritz
Aviation Consultancy, LLC
e-mail: frank.leyritz@gmail.com
Mobil: 206.457.9201

Puget Sound Clean Air Agency - PSCAA
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

As a life-long resident of the Puget Sound area, with an energy engineering background, I am supporting PSE'S LNG facility at the Port of Tacoma.

At The Public Hearing at the Rialto Theater on October 30, 2018:

Several paid consultants for the Puyallup Tribe testified at the hearing that "The Puyallup Tribe opposes the siting of this facility".

They stated the tribe was not meaningfully consulted about the project by PSE. The Tribe considers PSE's Tacoma LNG facility a "threat to its lands, waters and people"; and also "poses significant and potentially catastrophic threats not just to their fishing rights and resources, but to their homeland, people and neighbors".

In my opinion:

1. In my opinion, just stating that LNG facility is a "threat to its lands, waters and people to me is an emotional statement without any facts being offered.

2. The consultants did not specify specific threats in engineering terms to adequately explain the threats. Fifteen government agencies have granted permits before and during construction, so that means to me this is a safe project.

3. If the issue that PSE did not meaningfully consult the Tribe about the project could cause a delay for the latest permit, I feel the Tribe's consultants should send to PSE a complete list of their concerns and questions, to enable PSE to respond back in engineering terms, so PSE's report can be properly reviewed by the Puget Sound Clean Air Agency and the other permitting agencies.

Thank You

Frank C. Leyritz
e-mail frank.leyritz@gmail.com
Mobil 206.457.9201

Steve: Thank you. Next up, Carolyn DeFord. Juan Jose Chavez?

Juan: Good evening. Sorry, you guys have to put up with all of this all night, but you signed up for it. The last time I was here, I had my young daughters dancing ballet on this stage. And that's why I'm here tonight. I'm not here for me. My time is limited on this earth, just like a lot of people.

[06:27:00] But I'm trying to speak for the people who haven't come here in several generations. Somebody mentioned the south. You guys know that the south is known for a polluted area. Some things got shoved down their throat, without having educated crowds speaking against it. Another thing that I was thinking about today, I was trying to see what I had to say. In 1933, doctors were giving people cigarettes as a healthy option. And we all know that cigarettes are bad for you. But they didn't know that back then. They were like hey, it's a new thing. Once they added their chemicals to it, it became addictive.

It took 20 years for people to figure out they created cancer. Same thing here, people. They have a 50 year option because they know this is a long term thing.

[06:28:00] Now, I hate for you to make those decisions, but I don't want to find out 50 years from now that what your decision was was bad. I think, to me, the best option for this is that, just like cigarettes, we agree that we don't know. Nobody is rushing us. The president, the first thing he did was kill the EPA. Think about that. Corporations are people. And they benefit. But I don't want them to benefit in my children's fish, my children's trees.

I don't want them to benefit on the fact that because we think that they're going to know what our air is going to be like – they're claiming that they know how they're going to clean up our air in 90 years from now or 50 years from now because they don't even know. Thank you.

2183-1 22. General Opposition

From: mchristensen324@everyactioncustom.com on behalf of Mary Christensen
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, October 24, 2018 1:40:24 PM

Dear Responsible Official,

I am relieved this huge project - and environmental disaster - has been halted. Hooray for careful analysis and measured thinking. Please choose to make our world cleaner, not sicker. No good has come from fracking; it has only prolonged our dependence on oil and sped the way to rising temperatures. It's frightening, truly.

Please stop the project.

Sincerely,
Mary Christensen
Eugene, OR 97405
mchristensen324@gmail.com

1370-1 22. General Opposition

From: Rose Christopherson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:49:46 AM

Name: Rose Christopherson
Email: rose.christopherson@comcast.net
Address: 14707 Nw Cedar St -
Portland, Oregon 97231

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I don't think I have the skills that seem to be needed to volunteer.

From: Barbara Church
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 3:39:10 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Barbara Church
jbchurch2@gmail.com
6402 1st St. Crt NE
Tacoma, Washington 98422

2249-1 10. LCA Calculations
2249-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2249-3 10. LCA Calculations
2249-4 13. LCA Inputs and Assumptions - Natural Gas Source
2249-5 10. LCA Calculations

0449-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Jim Church

Address or email jimmchurch@gmail.com

I am a retired educator and private sector data analyst/consultant. I have spent 37 years working with data and research. I was trained to look at studies and models with a critical eye toward reliability and validity. It is well known in the industry that there is a research study to support any stand. Looking at the DSEIS studies concerns me. The GWP values are extremely outdated. A 2007 IPCC AR4 report looks out to 100 years showing a GWP value of 25. Many would like you to look no further. I not only encourage all decision makers to look to the 20 year GWP number which is nearly three times that of 100 years, but to

(over)

look to the most recent scientific study which is currently 2016 showing the GWP values at 96 for 20 years and 32 for 100 years.

I plan to be still living here in 20 years and the quality of my life will greatly depend on the quality of our air, land and water.

Look to current studies! Pay attention to the data that will impact residents for years to come. You will all be remembered for your thoughts and actions.

Sincerely,
Jim Chmiel

0449-1 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value

0466-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I have lived here all my life. I have taken environmental stands for my family and communities. I have seen big money side steps regulations in order to bring in a project with an LLC at the end with minimal accountability. PSE has a bad track record of disregarding proper process, blatant disregard for public process, and poor emergency related care of impacted communities. No trust.

Please include this in the final supplemental environmental impact statement.

Name: Jim Church	Phone: 253 878 3138
Address: 6402 1st St. Ct. NE, Tacoma	Email: j.m.mchurch@gmail.com

1831-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: fireangel@everyactioncustom.com on behalf of Leslie Cirigliano
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:13:48 AM

Dear Responsible Official,

Thank you for your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis.

Scientists' are learning daily of methane's impact on the climate. Incrementally, they learn that fracking allows a higher amount of methane to escape than previously thought. They are also discovering more negative impacts of methane on the environment. Short term is even more serious than had been previously understood.

This project has a serious impact on the global climate. If the following points are taken into consideration, it should be grounds to deny the Notice of Construction application.

Based on current IPCC analysis (AR5), Methane should be counted as 86 times more potent than CO2. Also, consider what it will do in 20 years, not 100. In 100 years, none of us will be here so we really don't need to worry about it. No urgency. But in 20 years, it will impact us all.

In British Columbia, (according to recent research which offered more realistic results), the impact of fracking and of methane in our atmosphere has, up to now, been dramatically under-estimated.

Only if Tote Marne were to use low-sulfur marine gas oil over heavy fuel oil, and install selective catalytic reducers and diesel particulate filters, (which is not part of the plan) can they lower SOx and NOx emissions.

Fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked can be used by Tote Marine to achieve a 50% GHG reduction, which is what they can realistically accomplish. None of this is part of the plan either.

In short, IPSE should provide electricity using renewable energy, not fracked gas, for cleaner energy efficiency.

Thank you for the opportunity to comment.

Sincerely,
Leslie Cirigliano
Clearfield, UT 84015
fireangel@comcast.net

1838-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Jeremy Clark
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 3:38:41 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I'm writing to you because I'm extremely concerned about the global climate crisis, and the immense challenges it presents to my generation. My name is Jeremy Clark, I'm 14 years old, and I'm a freshman at Cleveland High School in Portland, Oregon. I'm writing because the Supplemental Environmental Impact Statement (SEIS) you've conducted for the Tacoma LNG facility has major flaws, and doesn't provide the accurate or contextualized knowledge needed to make this decision. For example, the SEIS considers the impact of methane in the span of 100 years, despite the fact that methane does far more damage in the first 20 years of its life in the stratosphere than the 100-year span the SEIS provides. The impact it provides also comes from data from 2007, which is unacceptable considering that more recent data exists. With the recent and dire Intergovernmental Panel on Climate Change (IPCC) projecting that we have just 12 years to dramatically reduce our greenhouse gas emissions, it only makes sense to examine the effects of methane during the time it matters the most: right now. The SEIS also fails to acknowledge any emission sources that produce less than 1% of the total emissions of the project. The cumulative impact of these emissions is actually quite substantial, and thus should be included in the statement. For these reasons, and for the sake of my generation's future, I strongly urge that the PSCAA revise the SEIS and include information that allows us to see the full picture.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.
Sincerely,
Jeremy Clark

Jeremy Clark
shiblisa0@gmail.com
3400 SE 26th Ave
Portland, Oregon 97202

Carole: Thank you. Bliss Moore? William S. Clark?

[01:29:00]

William: I am 91 years of age. I was brought to Tacoma Washington, when I was 7 years old. I stayed in the Cushman Indian Hospital. I had tuberculosis. I spent three years there. At that time, there was a lot of plague of the Native people. Many of them died and buried over in that graveyard from tuberculosis. They don't know where it came from, who they are. Also, I have experience watching a tanker blow up down here near Atlas Foundry. We saw big smoke in the air, a man was killed. I also was in a hotel over in Port Angeles, when I was young, about 1973, with a new car. I was traveling around the coast, around the circle.

And I thought I'd been traveling long enough, and I wanted to stop overnight. So, I stayed in a hotel over there. First, I walked around the city to find a hotel I could stay in. And I finally decided I liked this hotel, so I went back there. I'm sitting in my room on the third floor reading my paper deciding whether I wanted to go to the restaurant, the bar downstairs to have something to eat or something to drink.

[01:30:01] It's getting late at night. I'm sitting and reading my paper. And I'm reading the paper, and I figured I'll read the paper and go downstairs. Then, I hear a big explosion, a whopping, big explosion. And the building shook. The floor sunk. The walls tipped. People were running all over the place, flames flying up in the street. It went dark, dust flying down out of the building. Dirt and dust flying all over the place. A tremendous explosion. I heard something about a bomb. I had natural gas in my house for many years. It's very volatile. It can blow up at any time. If you have it, you've got to have it under pressure.

You've got to have a technician to handle that stuff. It's very volatile. Even a spark can set it off. Electrical current can set it off. We're talking about we had a smelter down here one time. What did they put the smelter down here for? A big stack 450 or 550 feet in the air. Polluted the air, killed vegetation all over the country. The good thing is we got industry, jobs, jobs, jobs.

[01:31:02] We had a gas pipe down here one time, originally on the tide flats. I've been around here since about 7 years of age. They had a plant down here that manufactured gas on what is now this little inland waterway where it dug in. That place is the most polluted part of

the country yet. I don't think they ever got rid of the pollution down there. It was tremendously polluted. Tacoma seems to have a problem gathering crap, industries that put out crap. Burn all electricity, tons of electricity that they use for something that could be used for homes and people just for jobs.

I'm a little tired of this. I think Tacoma should start throwing away all of these people with these ideas. There's other ways of powering ships. I've seen ships out at sea blowing smoke out their stacks, tremendous black smoke. And I can understand maybe you need a cleaner way of doing it. That's absolutely true. However, we don't need to collect more industry putting people's health to risk.

[01:32:03] It's a dangerous situation you're talking about. You want to die? Put that gas plant down here. Who is going to guarantee that million ton, whatever it is, that 90 foot power down there isn't going to blow up? Thank you.

0361-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Josh Clearman

Address or email 3621 South L St, Tacoma WA 98418

Please approve the permit for the LNG plant. I am a tacoma resident ~~which~~ who wants greater energy security and no more bunker fuel.

I encourge you to recomend to PSE to buy gas from producers that limit methane leaks and emissions.

Thank you

Steve: Thank you. Next up is Rene Cournoyer. Josh Clearman?

Josh: Thank you all. And thank you for hearing us today.

[04:58:00] And thank you to my fellow folks here. And welcome to everyone from out of town. My name is Josh Clearman. I live in Tacoma. And I've lived here for six years with my kids. And before this, I lived in Key West, Florida where I was the co-author of the Climate Action Plan. My students and I installed the first wind tide grid tide turbine in the Florida Keys. We installed a 25,000 watt solar array. And I'm coming before you to fully support the LNG project. It is natural gas, as people have said, definitely has its problems. But I want to give another number out there, and it's 365.

That's the number of days that myself and my co-workers on Hilltop and my kids breathe bunker air. As you and your authority for Puget Sound air quality, I ask you to get the bunker fuel air out of the Puget Sound. Thank you.

[04:59:00]

Steve: So, before I get to the next five, just a heads up, the group after that will be LaDonna Robertson, Joanna Shoetler, Bret Stein, Dave Gering, and Norma Ramirez. So, next up, and I'm probably not going to do this justice. Saiyare Refaei. Sorry, if you'd state your name, so we can get it right.

Saiyare: Saiyare Refaei. Thank you for the opportunity to speak. Thank you for those who sacrificed to be here today. I send gratitude to the Puyallup Tribe of Indians whose land we currently occupy as a product of colonization and genocide.

[05:00:02] They continue to lead our justice work today. I would also like to lift up the immigrant detainees in the northwest detention center in Tacoma tide flats who do not get a say or maybe even know about the LNG plant that could have overtly harmful effects, given that their current emergency protocol is to stay place. My name is Saiyare Refaei, and I work at the Diversity Center at Pacific Lutheran University as the coordinator for sustainability integration. I am also a community artist. And this year, I was appointed to the city of Tacoma's Commission on Immigrant and Refugee Affairs.

Yet, I come to you today as a concerned, exhausted but not defeated, Tacoma resident. I want to share a memory. The evening

on July 18, 2017, I joined friends in the Tacoma tide flats to stand with the Puyallup People and community members, elders, families, and children. We held space unarmed peacefully and delayed unlawful construction for three hours through marching, song, and prayer.

[05:01:03] I was also taking pictures to share with those who were unable to attend. By the third hour, I remember Puyallup Tribal member, Dakota Case, coming to the large group and telling us the police are starting to get hostile. To please not do anything disrespectful. We held space long enough today, and we can come back tomorrow. As a couple of my friends and I were returning to where we had parked, we noticed a tinted, unmarked minibus that an officer entered suited in riot gear. My friend overheard the officer say, "Not today, guys."

I, frantically, messaged a couple of friends who were still in the larger group to make sure that they knew about the militarized presence that was there and hoped that they would get home safe. In the coming days, I learned that PSE was paying Fife police to be out there. Not for the protection of concerned community members, but to protect their profits and project that they were unlawfully constructing.

[05:02:02] Every time I see a PSE logo or greenwashed LNG ad, I think of that moment when PSE chose to invest in militarized force over hearing and respecting the wishes of the community they are supposed to be serving. They could have put all of our lives at risk. And I'm grateful to be standing here in front of you today. I truly hope the supplemental environmental impact statement is redone properly before denying the LNG permit. Our community has already experienced enough trauma over the last year because of this project. Thank you.

1683-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 7:20:22 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution.

Sincerely,

Heidi Cody
heidi@heidicody.com
98664

1567-1 22. General Opposition

From: otfolkdancer@gmail.com
To: Public Comment
Subject: Fumbles of Fracking
Date: Thursday, November 15, 2018 2:19:47 PM

Dear World,
We need to be responsible for saving our planet and people in our country. Fracking for gas is dangerous and could have been the cause of the most dangerous fire in California history. We nee to find other energy sources that ate renewable and less dangerous. That is where our focuses should be. Education and research for new energy sources or developing better batteries.

Sincerely,
Lorraine Cohn

From: Belinda Cole
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Sunday, November 18, 2018 12:05:10 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. Scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

I have a numbers concern with this draft SEIS:
1. It is incomplete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

2. Even in the existing incomplete report, I do not see credible evidence of that emissions will disappear.
To the contrary:
- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

2557-1 10. LCA Calculations
2557-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2557-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2557-4 19. LCA Inputs and Assumptions - End Use
2557-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2557-6 13. LCA Inputs and Assumptions - Natural Gas Source
2557-7 14. LCA Inputs and Assumptions - Leakage/Slippage

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Belinda Cole
oaktreegrows@gmail.com
Via Italia
Toronto, Ontario M6H 3R2

1711-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 12:47:45 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I promise you that lawsuits will be filed if this committee votes against public safety. Assurances are meaningless.

Sincerely,

Lissa Coleman
Lcol7@hotmail.com
94063

1730-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 8:05:04 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

For the love of God, do not risk the safety of a heavily populated area. If not , lawsuits are coming, and "jobs" that are promised through this project will not be worth the headaches.

Sincerely,

Lissa Coleman
Lcol7@hotmail.com
94063

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 6:04:29 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The risks taken with the project will not be worth the lawsuits to come. And come they will. I have family in Tacoma, and I do not want them exposed to more hazards than they already. They rent a house for 2,000.00 per month, but cannot trust their water supply, or have a sense of safety with that LNG tank looming in the port. I sense that hundreds of residents oppose any further development of fosoil fuel based industries ! When will enough be enough ? We urge you to please study impacts carefully before you vote.
Thank you.

Sincerely,

Lissa Coleman
Lcol7@hotmail.com
94063

2212-1 3. Outside of SEIS Scope
2212-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2212-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2212-4 7. SEPA Alternatives
2212-5 7. SEPA Alternatives
2212-6 5. Regulatory Framework

From: joanmranger@everyactioncustom.com on behalf of Joan Combes
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:57:01 AM

Dear Responsible Official,

How does the world stand a chance at a clean, safe future if we allow projects like the Puget Sound Energy and Tote Marine to proceed.

Fracked gas is not a lesser evil, as science has shown it allows MORE methane escapement than previously observed and the impact of methane on the climate is even more serious than previously understood.

Thanks for the decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Any analysis should reflect pertinent facts:

1.Methane is 86 times more potent than CO2;

2.The estimate amount release volume should AR5 not AR4 and reflect 20 not 100 years;

3. Replace the “no-action alternative” with a clean, renewable, efficient source e.g. electricity;

4. Revise the “no-action alternative” to include that Tote Marine must achieve a 50% GHG reduction, in line with the International Maritime Agency’s established goals.

5. Agree the project will not move ahead without the approval of the local Puyallup Tribe.

I believe incorporating the revisions above will result in a more accurate analysis.

It will also demonstrate the project has a significant and unmitigated negative impact on global climate than can be tolerated for the Earth to survive, which is a solid basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, ‘Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,’ Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Joan Combes
Huntington Beach, CA 92648
joanmranger@gmail.com

1464-1 22. General Opposition

From: Harriet Cooke
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:09 PM

Name: Harriet Cooke
Email: Holisticooke@aol.com
Address: 3126 SW Carson St -
Portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I am appalled at the draft analysis!
Common sense coupled with the reality that clean renewable energy is a more ecological AND profitable solution makes it absurd to even need an analysis. Isn't the recent IGCC report enough? Aren't the heightened California fires enough? It is time to say No more fossil fuel infrastructure and let's get on with healing and restoring the health of our planet and our economic system. Thank you. And I highly recommend you read Drawdown, edited by Paul Hawken, and go to his website to identify the kinds of projects we need to invest in!

1782-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 4:12:49 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

We need fossilized carbon sources to stay in the ground.

Sincerely,

Brianna Cooper
BriaBoo2008@aol.com
98513

2221-1 22. General Opposition

From: Gail Cordell
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Friday, November 16, 2018 8:48:36 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I am only a 'pass through' visitor to Tacoma. However, I had the opportunity a year or so ago to go to Vashon Island. Since I had never seen the ferry part of the city I arrived early to explore. I was pleasantly surprised by my drive along the bay...walking trails, businesses and homes looked very inviting.

Because I had heard about the potential LNG site I visited the area around TOTE. I was saddened by the state of the bay in that area and my son informed me it was a superfund site. I saw areas where remediation through planting was being undertaken.

It seems ironic to be developing one part of the citiy's waterfront for residential and recreational opportunities while trying to build a major climate exacerbating facility closeby.

Unless you truly believe climate change is a hoax, one can only conclude that allowing industry to capitalize on the glut of fracked gas by permitting the continued expansion of fossil fuel facilities is a cynical disregard of the increasing awareness of what lies ahead if we continued down this path of willfully abetting climate disruption.

I urge you to reconsider the science that makes this project untenable and do not permit more nails in our environmental coffin.

Gail Cordell

Gail Cordell
cordellbank@comcast.net
17370 S Potter Rd
Oregon City, Oregon 97045

0632-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about recent research showing that methane leaks in much greater ~~concentrations~~ quantities than previously thought. How can we adequately understand how much methane needed for this facility has leaked through the process of being fracked + transported to this facility? Please include in the FEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email:
Address: 520 N 45th Street Unit A Seattle, WA 98103	Phone:

0633-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about impacts to air quality of communities where fracking occurs. People living near fracking are more likely to be hospitalized for health ailments. I worry about this project increasing demand for fracked gas and further threatening the health of these communities. What are the air impacts of the fracking process in the neighborhoods where gas from this project will come from? Please include in the FEIS

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email:
Address: 520 N 45th St. Unit A Seattle, WA 98103	Phone:

0636-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about health impacts to tribal nations in the vicinity of this project. Tribal members already have higher rates of asthma & cancer than neighboring communities. How will this facility impact tribal health? Please study these impacts in the FEIS

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email: Sarah@wpsr.org
Address: 520 N 45th Street unit A	Phone: 206-547-2650

0637-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about pipeline leaks. The recent gas explosion in Massachussets have me concerned about the additional pipeline capacity this project requires. Please study the quantity of leaking gas that will result from new pipelines required by this project + the impact to air + water quality in the FEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email: Sarah@wpsr.org
Address: 520 N 45th St. Unit A Seattle, WA 98103	Phone: 206-547-2630

0638-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about toxic chemicals blended in fracked gas that could leak through pipelines & other infrastructure for this project. Please study what these toxics are & how they impact health in the FSEIS

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Lamott	Email: Sarah@wpsr.org
Address: 520 N 45th Unit A	Phone: 206-547-2650

0639-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the health consequences of Climate Change. Methane is 86 times more potent than CO_2 as a climate warming ~~gas~~ gas. Please study how this facility + the cumulative gas required for it will contribute to climate change

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email: Sarah@wpsr.org
Address: 520 N 45th St. Unit A	Phone: 206-547-2620

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the impact of this facility operating at full capacity. The company has said it will not do so, but why would they build it if so? Please study the environmental impacts of the project operating at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email:
Address: 520 N 45th Street Unit A	Phone:

0643-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the air impacts of the trucks necessitated by this facility. Please study the health impacts of the diesel pollution that will result from increased traffic.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Gimett	Email:
Address: 5720 N 45th St. Unit A Seattle, WA 98103	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2143-1 3. Outside of SEIS Scope

I am concerned about the air impacts of the trucks necessitated by this facility. Please study the health impacts of the diesel pollution that will result from increased traffic.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Grnett	Email:
Address: 520 N 45th St. Unit A Seattle, WA 98103	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2145-1 3. Outside of SEIS Scope

I am concerned about the impact of this facility operating at full capacity. The company has said it will not do so, but why would they build it if so? Please study the environmental impacts of the project operating at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	**Email:**
Address: 520 N 45th Street Unit A Mt. Vernon, WA 98273	**Phone:**

2147-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am concerned about the health consequences of Climate Change. Methane is 86 times more potent than CO_2 as a climate warming ~~gases~~ gas. Please study how this facility & the cumulative gas required for it will contribute to climate change

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	**Email:** Sarah@wpsr.org
Address: 520 N 45th St. Unit A Seattle, WA 98103	**Phone:** 206-547-2670

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2148-1 3. Outside of SEIS Scope

I am concerned about health impacts to tribal nations in the vicinity of this project. Tribal members already have higher rates of asthma & cancer than neighboring communities. How will this facility impact tribal health? Please study these impacts in the FEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	**Email:** Sarah@wpsr.org
Address: 520 N 45th Street unit A Seattle, WA 98103	**Phone:** 206-547-2650

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2150-1 3. Outside of SEIS Scope

I am concerned about toxic chemicals blended in fracked gas that could leak through pipelines & other infrastructure for this project. Please study what these toxics are & how they impact health in the FSEIS

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Lamett	**Email:** Sarah@wpsr.org
Address: 520 N 45th Unit A	**Phone:** 206-547-2630

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2151

2151-1 3. Outside of SEIS Scope

I am concerned about pipeline leaks. The recent gas explosion in Massachussets have me concerned about the additional pipeline capacity this project requires. Please study the quantity of leaking gas that will result from new pipelines required by this project & the impact to air & water quality in the FEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	Email: Sarah@wpsr.org
Address: 520 N 45th St. Unit A Seattle, WA 98103	Phone: 206-547-2630

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2153

2153-1 3. Outside of SEIS Scope

I am concerned about impacts to air quality of communities where fracking occurs. People living near fracking are more likely to be hospitalized for health ailments. I worry about this project increasing demand for fracked gas and further threatening the health of these communities. What are the air impacts of the fracking process in the neighborhoods where gas from this project will come from? Please include in the FEIS

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	**Email:**
Address: 520 N 95th St. Unit A Seattle, WA 98103	**Phone:**

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2154-1 14. LCA Inputs and Assumptions - Leakage/Slippage

I am concerned about recent research showing that methane leaks in much greater ~~concentrations~~ quantities than previously thought. How can we adequately understand how much methane needed for this facility has leaked through the process of being fracked + transported to this facility? Please include in the FEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Cornett	**Email:**
Address: 520 N 45th Street Unit A Seattle, WA 98103	**Phone:**

1243-3 22. General Opposition
1243-3 3. Outside of SEIS Scope
1243-3 5. Regulatory Framework

From: Logan C
To: Public Comment
Subject: Tacoma LNG
Date: Wednesday, November 21, 2018 10:02:57 PM
Attachments: Tacoma LNG.pdf

Hi there,

Attached are my comments on the proposed Liquefied Natural Gas facility in the Port of Tacoma.

Thank you,
Logan Cornwell

11/20/2018

Public comment regarding the Draft Supplemental Environmental Impact Statement for the Tacoma Liquefied Natural Gas (LNG) facility.

I attended the evening portion of the public comment event at the Rialto Theater on the October 30th There were a couple of points that were brought up that I want to review again.

First, the disrespect for each other was unacceptable and I am sorry we couldn't have a respectful debate. I would like to point out that the Big Oil companies paid employees to attend the hearing when everyday workers took the time out of their day to attend. The everyday workers included Nurses, Scientists, Tribal Members, Teachers, Students, Parents, and concerned citizens. The residents of Tacoma came to voice their opposition to this project. Younger generations have limited say on the future but still teens showed up for the public comment event. I am a 16 year old and with the direction our world is going, we can't afford a 40 year commitment to fossil fuels. Tacoma needs to be a leader in the fight against climate change.

TOTE Maritime already meets the International Maritime Organization's standards for clean emissions, LNG would just be a way for them to shave down the cost. There was a 2.9 earthquake in Tacoma the very same day as the hearing. This presents a danger to the residents of Tacoma, we face many potential threats including an active volcano, earthquakes, tsunamis, fires, the list goes on.

There have been several fires in the Port of Tacoma this year, we could smell the smoke from our home miles away. This would quite literally be adding fuel to the fire. This would seriously hurt the residents of East Side as well as the detainees at the Northwest Detention Center since their emergency plan is to shelter in place.

The native Puyallup Tribe made it clear that they were not meaningfully consulted before the start of this project. We need to respect their input and not let the past repeat itself.

I urge you to reject this proposal, this SEIS is missing key information as pointed out at the public comment event.

I appreciate you taking the time to listen to our concerns,
Logan Cornwell

al Port of Kalama, and Cowlitz County,

ar Puget Sound Clean Air Agency,

2063-16. Purpose and Need

I AM CONCERNED THAT THE LNG FACILITY AND THE METHANOL REFINERY WILL NOT REDUCE FOSSIL FUEL USE BUT MAY ACTUALY INCREASE FOSSIL FUEL USE. PLEASE INCLUDE SPECIFIC STUDY RESULTS IN THE FSEIS.

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: STEVE COTTER	Email: SCOTTER52@HOTMAIL.COM
ddress: 6634 159TH AVE NE	Phone: 425-883-0517

al Port of Kalama, and Skamit County,

ar Puget Sound Clean Air Agency,

I AM CONCERNED ABOUT AIR POLLUTION FROM TOE FRACKING OPERATIONS - TRUCKS, COMPRESSORS, ~~ETC~~. AND LEAKED METHANE PLEASE INCLUDE MY CONCERN IN THE FSEIS

2065-1 3. Outside of SEIS Scope

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: STEPHEN COTTER Email: SCOTTER[redacted]52@HOTMAIL.COM

ddress: 6634 159TH AVENUE REDMOND, WA 98052 Phone: 425-883-0517

2066-1 12 LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I AM CONCERNED ABOUT GLOBAL WARMING. PLEASE INCLUDE THE MOST UP-TO-DATE GLOBAL WARMING POTENTIAL FOR METHANE, AT 86 CARBON DIOXIDE EQUIVALENTS IN THE ~~EIS~~ FSEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: STEVE COTTER	Email: SCOTTERS2@HOTMAIL.COM
Address: 6634 159TH AVE NE.	Phone: 425-883-0517

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2067-1.3, Outside of SEIS Scope

I AM CONCERNED ABOUT PIPELINE LEAKS IMPACTING THE LAND THE PIPELINE IS ON. PLEASE INCLUDE RESPONSES IN THE FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: STEPHEN COTTER	Email: SCOTTER52@HOTMAIL.COM
Address: 6634 159TH AVE NE REDMOND 98052	Phone: 425-883-0517

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2068-1.3 Outside of SEIS Scope

I'm CONCERNED ABOUT THE LIQUIFACTION OF THE SOILS (LANDFILL) AT THE TACOMA PSE LNG TANK DURING FUTURE EARTHQUAKES. PLEASE INCLUDE YOUR STUDY RESULTS ABOUT THIS ISSUE IN THE FSEIS.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: STEVE COTTLER	Email: SCOTTLER52@HOTMAIL.CO
Address: 6634 159TH AVE NE REDMOND WA 98052	Phone: 425-883-0517

[01:40:00]

Carole: Thank you. Michael Cox?

Michael: Hello. My name is Michael Cox. I work for the US Environmental Protection Agency for 25 years in Washington DC and EPA Seattle office. My last job prior to retirement, I was a climate change advisor for EPA, and my job was to help governments, business, industry reduce their greenhouse gases and adapt climate change. So, I first want to thank you for doing this EIS. I think it shows that you place an understanding on the project's climate impacts and the importance of it.

However, after reading the draft environmental EIS, I believe it does not accurately capture the climate impacts from the project and ask that you revise the draft and then provide an opportunity for public review and comment prior to making a final decision on the air permit.

[01:41:03] As you know, the assumptions that are made in this type of analysis drive the results. Based on my experience, which I have some working int his field for many years, an understanding of the project. I believe the current assumptions used in this analysis underestimate the greenhouse gas emissions. And I'm not going to go into the details of those. You've already heard those. So, in conclusion, I want to remind you of your organization's long term vision for the region's air quality and climate that was so well articulated in your 2014/2020 strategic plan. The vision included three aspirations.

First, all of the people and natural systems in our region benefit from clean air and healthy air, at all times, regardless of socioeconomic status or geographic location. Second, our region does its part and more to protect the environment.

[01:42:03] And finally, everyone in the region must play an active role in achieving this vision. In my judgment, to honor this vision, I think you must modify the draft EIS to better characterize the climate impacts from this project and then, provide an opportunity for public review and comment prior to making a final decision on the air permit. Thank you for the opportunity to comment, on this important topic.

1894-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

The IPCC report tells us that we have only 10 years to stop using fossil fuels. This infra-structure would lock in this use of gas for 40 years. We can not do business as usual.

_____(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Linda Craig Email: linda@quimbyclub.org

Address: 3433 NW Quimby St., Portland, OR 97210

By completing this comment card you agree to receive updates about the project.

1626-1 3. Outside of SEIS Scope

From: Tom Craighead
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, October 27, 2018 9:19:38 AM

My family lives on the south end of Vashon. Our island directly faces and is often downwind of the proposed site for the Tacoma LNG facility. To my knowledge, this next door neighboring community has not been directly consulted or considered in your review.

The people of Vashon have long been familiar with airborne threats from Tacoma. For many years, our soils as well as the Puget Sound waters were showered with deadly poisons from the Asarco smelter plume. Today, ocean-going freighters frequently anchor close to our shores. Some nights I can smell their exhaust, hear their engines.

The proposed project worries me. It sounds like Tacoma could become an international LNG distribution hub. Will the proposed facility bring more freighter traffic, more fouled, even toxic air? How can I know there won't be leaks or a major accident?

I need reassurance that my community's air and health will be kept safe. The current DSEIS fails to provide that reassurance and does not answer my questions (see above). Accordingly, I strongly object to permitting the PSE LNG project as proposed.

Thank you for considering my comment.

Tom Craighead
P. O. Box 13213
Burton, WA 98013
253-732-9558

2245-1 10. LCA Calculations
2245-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2245-3 10. LCA Calculations
2245-4 13. LCA Inputs and Assumptions - Natural Gas Source
2245-5 11. LCA Inputs and Assumptions - General

From: Michael Craven
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 6:14:50 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Michael Craven
michaelrcraven22@gmail.com
1535 27th Ave. SE
Puyallup, Washington 98374

Steve: Thank you. Michael Foster? Jessica Lee? Bill Crawford?

Bill: Good evening. My name is Bill Crawford. I've worked for TOTE for 15 years. I wanted to just take this opportunity to thank you for being here tonight and giving me the opportunity to speak.

[06:10:05] I'd say it's been extremely humbling and sad, quite frankly, I think, listening to a lot of the comments tonight. We all want to do the right thing for the environment. Although I live in West Seattle now, I grew up here in Federal Way on the hill. I went to school up there, elementary, Illahee Junior High, Decatur High School. I spent my childhood passionately fishing Puget Sound and these waters. I still do a lot today, with my son. TOTE is committed to the environment. It's a part of our core values. And we have a proven track record to show that, to prove that.

And that's been expressed, I think, numerous times tonight, just in terms of what we've done with rain gardens, shore power, etc. The fact is that LNG is the cleanest available fuel source in the shipping industry.

[06:11:00] And we've been at the forefront of this for several years. And we're very, very proud about the work that we've done. And we're looking forward to completing what we've done. LNG is widely used and viewed as the best alternative to diesel because its uses directly reduces the emissions that were discussed tonight. CO_2, nitrogen oxide, particular matter, and carbon dioxide. Any and every delay that is made to this transition of burning cleaner fuel means that increased pollution will be caused by bunker fuel, which is the only other possible source, which was also mentioned.

So, this project is good for the environment. It's good for Tacoma and South Sound. It's good for labor. It's good for jobs. And it's safe. Because of these facts, we ask that the project move forward without delay.

[06:12:03] Thank you.

1460-1 22. General Opposition

From: Hayley Cron
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 10:27:17 AM

Name: Hayley Cron
Email: konagirl1@gmail.com
Address: 1721 SE Tacoma St. -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We have no place for fracked gas in the Puget Sound or anywhere. Its time for us to move towards clean energy options and fracked gas is not one of those options. The future of this planet and the next generations depend on us to make significant changes right now. We must act!

2203-1 22. General Opposition

From: crosbykendall4@everyactioncustom.com on behalf of Kendall Crosby
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 12:59:08 PM

Dear Responsible Official,

We MUST invest in a healthy climate for ALL. We can't afford any increase in CO2. Please stand for our shared planet or it will no longer sustain us.

Sincerely,
Kendall Crosby
Portland, OR 97205
crosbykendall4@gmail.com

0348-1 22. General Opposition
0348-2 5. Regulatory Framework
0348-3 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Shelby Cross

Address or email shelcro@gmail.com

It is important and necessary to consult the Puyallup Tribe before building a facility such as the LNG plant on their treaty protected land, endangering sacred waters. This consultation never happened, that is NOT okay. A similar plant had an explosion in Canada recently. How is the PSE Fife LNG plant any safer than Canada's? Take the advice from the Puyallup Tribe. They've been here longer and know the land better than you. Do not put the Puget Sound / Puyallup River on danger!! Take all of our comments seriously and to heart. WE DO NOT CONDONE THE CONSTRUCTION OF LNG PLANT!

2237-1 10. LCA Calculations
2237-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2237-3 10. LCA Calculations
2237-4 13. LCA Inputs and Assumptions - Natural Gas Source
2237-5 11. LCA Inputs and Assumptions - General

From: Edward Cruz
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 7:39:01 AM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am not a Tacoma resident. But I have family and many friends in Tacoma, and I visit regularly. And all of us are very concerned about the advent of an LNG facility on the Sound.

I have read the SEIS. It appears to purposely use old information, and my son, who is a biologist working in Tacoma pointed out significant missing information as well.

The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

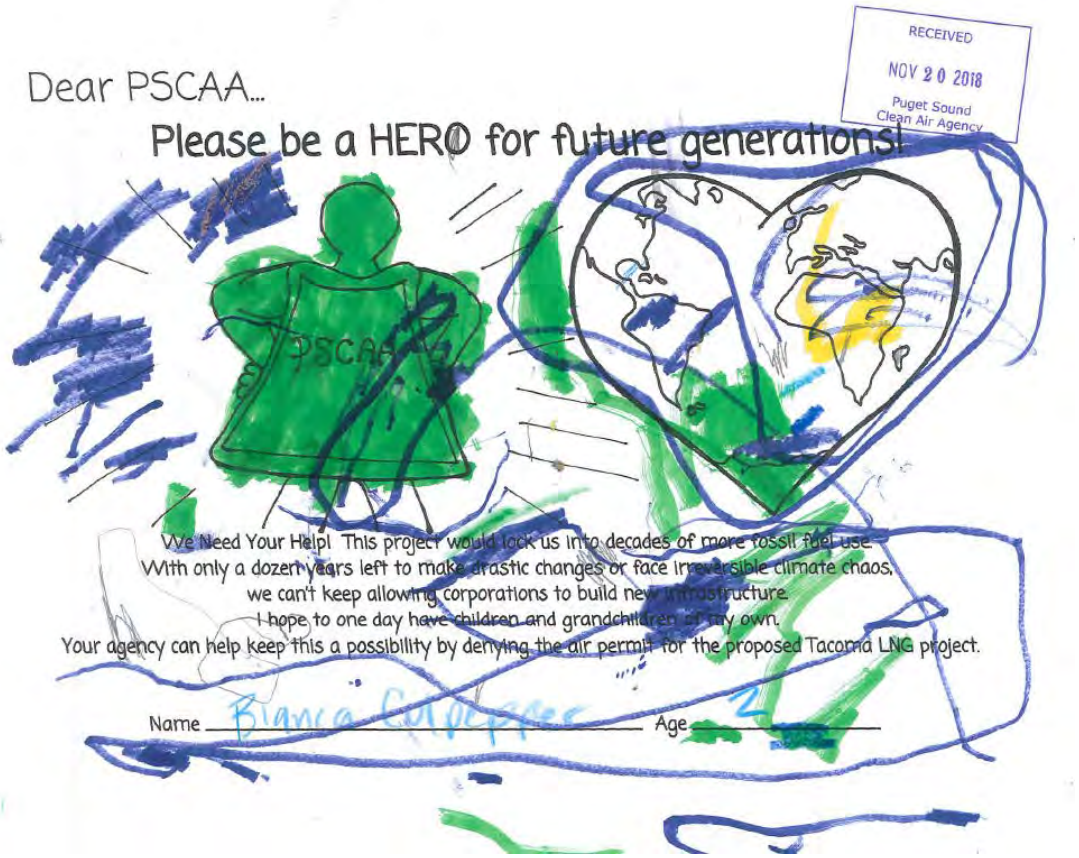
How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Edward Cruz
eddad@thecruzers.com
4693 Via Don Luis
Newbury Park, California 91320

2474-1 22. General Opposition



From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 9:17:19 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup Tribal treaty land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Sincerely,

Brenda Cummings
brensiv2@yahoo.com
98405

0455-2 3. Outside of SEIS Scope
0455-2 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a nurse, a mom, and wife to a firefighter. I'm also a former 911 operater and police/fire/medical dispatcher. I am VERY concerned about the safety of the proposed LNG plant. My children will be attending schools within the LNG plant's zones. My husband and I could be working within a zone. We could be injured ourselves, or caring for victims. There will be no response plan until the plant is operational! This shows a complete lack of concern for the safety and wellbeing of the residents of Tacoma. The plant is dangerous and the lack of a health assessment and ERP is extremely reckless.

Please include this in the final supplemental environmental impact statement.

Name: Emily Currie	Phone: 253-777-2354
Address: 3718 N. Verde St	Email: ebarlowcurrie@gmail.com

0456-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a runner and an outdoor enthusiast. I am concerned about the contribution to climate change that would be made by Puget LNG, LLC if built in Tacoma. It's production of CO_2 would contribute to climate change and dirty air. I can't run when the air is too dirty. I want to breathe CLEAN AIR. I do not want an LNG plant in Tacoma.

Please include this in the final supplemental environmental impact statement.

Name: Emily Currie	Phone: 253-777-2354
Address: 3718 N. Verde st	Email: ebarlowcurrie@gmail.com

0654-1 22. General Opposition

Sandra Curtis
4003 Seneca Dr.
Mount Vernon, WA 98273-9149



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OCT 31 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
1904 3rd Ave, #105
Seattle, WA 98101

SEATTLE WA 980
29 OCT 2018 PM 3 L

Please! Say NO to any new fossil fuel projects—like Port of Tacoma LNG massive fracked gas hub at Port of Tacoma. Please conduct the strongest environmental review possible, and REJECT this dirty natural gas facility. Please move forward towards renewable resource energy projects.

Sandra Curtis
Mt Vernon, WA

2187-1 3. Outside of SEIS Scope

From: lcwilson331@everyactioncustom.com on behalf of Lauren Cutler Wilson
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 2:52:18 PM

Dear Responsible Official,

I am willing to use less natural gas because I believe that fracked natural gas is very damaging to the environment. Please do not build a 14 story tall fracked gas tank at the Port of Tacoma. We have to stop ignoring the damage we are doing to our environment and the threat our continued heedessness holds for our children's future. Fracking threatens aquifers and causes earthquakes. Tear up the plans for the fracked gas tank, and make plans to invest in alternative energy products that will ensure the health of our environment for future generations.

Sincerely,
Lauren Cutler Wilson
Seattle, WA 98116
lcwilson331@gmail.com

1769-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:02:00 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Heather Dachary
hpdachary@gmail.com
98103

1746-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 7:37:46 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

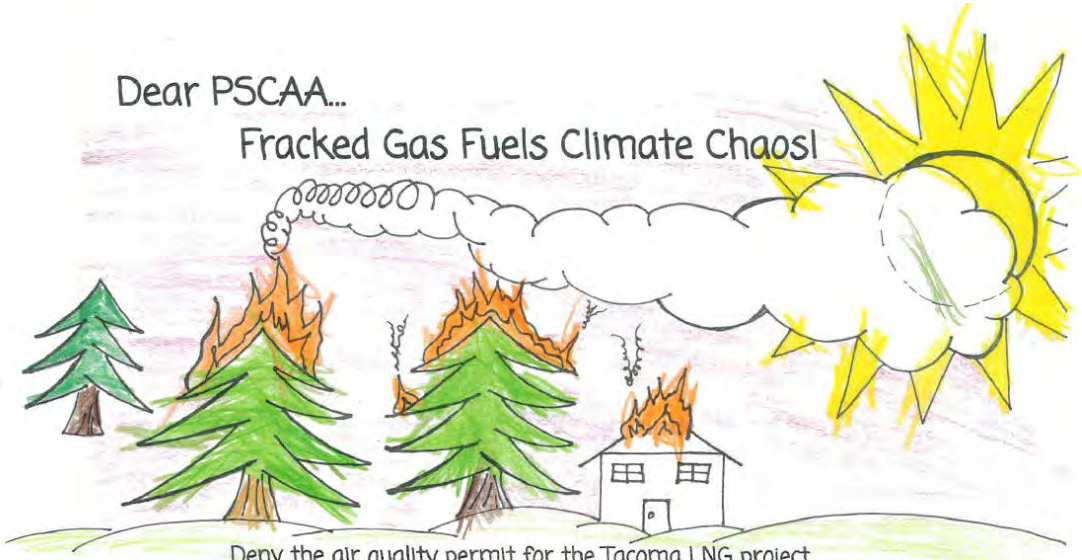
Sincerely,

Christin Dahl
dahlschance@msn.com
98203

1263-1 22. General Opposition

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage, "natural" gas is potentially as bad for the climate as coal.

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NOV 21 2018
Puget Sound
Clean Air Agency

Name Shel Dambergs Age 4

"No more LNG. That's all."
-Shel.

1264-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Shel Daubergs Age 7

RECEIVED
NOV 21 2018
Puget Sound
Clean Air Agency

1265-1 22. General Opposition

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.

Please Value People Over Corporate Profits!

RECEIVED
NOV 3 1 2018
Puget Sound
Clean Air Agency

Name Shel Dambergs Age 4

"LNG is Methane." - No More LNG - Shel

1766-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:45:44 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Eric Danielson
edanielson2010@gmail.com
98422

1554-1 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Irene Danysh
To: Public Comment
Subject: Concern over Tacoma LNG Plant on Air quality, issue of possible leakage
Date: Wednesday, November 21, 2018 5:06:40 PM

To Whom It May Concern,

Thank you in advance for reviewing the draft SEIS for the Tacoma LNG Plant regarding the question of taking into account possible leakage once the LNG is aboard a ship – the slippage. I believe the author needs to revisit the conclusions here in more detail.

Thank you. I am concerned for my health and the health of those at NWDC who are close by and cannot easily evacuate.

Sincerely,
Irene Danysh
13664 17th Avenue SW
Burien. WA 98166

Sent from Mail for Windows 10

1555-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1555-2 3. Outside of SEIS Scope

From: Irene Danysh
To: Public Comment
Subject: Concerns about Tacoma LNG Plant on Air Quality
Date: Wednesday, November 21, 2018 5:00:31 PM

To whom it may concern,
This is a comment on the Tacoma LNG Plant. I am requesting that in you assessment you use a 20year, not a 100-year GWP value.

I live not far from Tacoma and I am very concerned about the air quality and other effects the LNG Tacoma plant could create. I also am very concerned about the detainees at NWDC who have no choice but to be extremely close to this plant, and who could not be evacuated in a timely manner given the federal bureaucracy and security issues there.

Thank you for your work.
Sincerely,
Irene Danysh
13664 17th Avenue SW
Burien, WA 98166

Sent from Mail for Windows 10

1828-1 22. General Opposition

From: Irene Danysh
To: Public Comment
Subject: Tacoma LNG Plant - concern over air quality after green house gas emissions
Date: Wednesday, November 21, 2018 5:10:16 PM

To Whom It May Concern,

Thank you in advance for reviewing the draft SEIS of the Tacoma LNG Plant regarding the huge amount of sand, water and greenhouse gas emissions consumed and produced at the well-head. I request that you make further study of this aspect.

We need clean air in Washington State, a clean environment, and the LNG Plant could create significant harm if we don't study sufficiently and carefully enough its effects.

Thank you,
Sincerely,
Irene Danysh
13664 17th avenue SW
Burien WA 98166

Sent from Mail for Windows 10

1829-1 22. General Opposition

From: Irene Danysh
To: Public Comment
Subject: Tacoma LNG Plant - concern over best science re: methane and effects on Air Quality
Date: Wednesday, November 21, 2018 5:13:40 PM

To Whom It May Concern:

Thank you in advance for reviewing more carefully in the SEIS for the Tacoma LNG Plant the fact that the study is not yet using the best available Global Warming Potential science regarding methane.

I request that you please correct this matter.

Our lives demand on clean air, a clean environment, and the future of so many children will be damaged if we go ahead without proper study, and put in place this harmful plant.

Thank you.
Sincerely,
Irene Danysh
13664 17th Avenue SW
Burien WA 98166

Sent from Mail for Windows 10

1875-1 22. General Opposition

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

_____

_____

_____

_____

_____(Check here to continue comments on the other side.)

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the project must be done.

Name: Mark Darienzo Email: markdari@pacifier.com

Address: 6923 NE Moms St Portland OR 97213

By signing this comment card you agree to receive updates about the project.

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
Project

1761-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 6:19:54 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and to express significant concern.

There has not been enough done to research the full environmental impact of this project. Your "current" research puts the lives of too many at a grave risk.
Sincerely,

Audie davis, audiedavis400@gmail.com, 98321

Sincerely,

Audie Davis
audiedavis400@gmail.com
98321

1390-1 22. General Opposition

From: Laura Davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:17 PM

Name: Laura Davis
Email: davislauradavis@gmail.com
Address: 2010 NE 74th ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don’t build a natural gas facility.

1402-1 22. General Opposition

From: Laura Davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:04 PM

Name: Laura Davis
Email: davislauradavis@gmail.com
Address: 2010 NE 74th ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don’t build a natural gas facility.

1412-1 22. General Opposition

From: Laura Davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:53 PM

Name: Laura Davis
Email: davislauradavis@gmail.com
Address: 2010 NE 74th ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don’t build a natural gas facility.

1419-1 22. General Opposition

From: Laura Davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:41 PM

Name: Laura Davis
Email: davislauradavis@gmail.com
Address: 2010 NE 74th ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don’t build a natural gas facility.

1435-1 22. General Opposition

From: Laura Davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 10:09:39 PM

Name: Laura Davis
Email: davislauradavis@gmail.com
Address: 2010 NE 74th ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don’t build a natural gas facility.

1507-1 22. General Opposition

From: nancy davis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:06 PM

Name: nancy davis
Email: portornancy@gmail.com
Address: 1517 ne 148th pl -
portland, Oregon 97230

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

PLEASE No more fracked gas. It is bad for everyone but those choosing to make money while harming the land, air and people here in the Pacific Northwest.

1609-1 3. Outside of SEIS Scope
1609-2 7. SEPA Alternatives

From: Rachael De Souza
To: Public Comment
Subject: please carefully reconsider negative health impacts of PSE"s proposed LNG plant.
Date: Wednesday, November 21, 2018 8:33:25 PM

Thank you for carefully reviewing testimony from local residents about PSE's proposed LNG plant in the Port of Tacoma. I am Rachael De Souza, and I live and work in Tacoma. I current work as a nurse in one of Tacoma's major hospitals. I've also worked at the Tacoma Pierce County Health Department's Environmental Health Division, in the asthma education and home health programs. I have a Masters degree in Community Health Nursing, with focus on Environmental and Occupational health, from UW Seattle. I also have a Masters degree in Public Health, again with a focus on occupational and environmental health. I've worked in and published peer reviewed research on programs addressing the negative impacts of air quality on human health, as well as worker safety programs.

I'm writing today to respectfully request you carefully reconsider the impacts on human and environmental health of PSE's proposed LNG facility in your SEIS process. I ask you for to consider the full impacts of harvesting, transporting, and burning LNG in our area, and also compare that to the other reasonable alternatives.

To many people, this project feels legitimately confusing, because LNG indeed burns cleaner at its point of use, and so in some senses "will clean up the port." Health professionals actually have supported LNG before. For example, there have been planning processes in Long Beach/LA, in which health professionals actually supported LNG, over diesel, because it "burns cleaner." In my experience as an occupational health professional, doing respirator fit testing for industrial workers, I understand how bad it is to be exposed to air contaminants day in and out. I also have worked with families who have kids with asthma living around the port of Seattle and also here in Tacoma, and so I understand wanting a cleaner burning fuel in the port.

Yet, while LNG may burn cleaner, it's still producing air contaminants, which port workers of all people will breathe in every day. That's why, with regard to worker health, I believe LNG is not "a step in the right direction," as industry says, but rather simply a smaller step continuing in the wrong direction. If we really want to move in the right direction, and protect worker health, we need to truly clean up the port, which means electrifying all operations. That would eliminate air pollution exposure. We can't pretend that we value health of workers and local folks and "cleaning up the port" if we don't push for electrification. Electrification is a real possibility in the port of Tacoma, presents job opportunities, and protects worker health and community health.

The only alternative considered in PSCAA's supplemental SEIS is "doing nothing/status quo." I ask that your organization consider, or at least acknowledge, the option of electrification of port activity. If we compared LNG to electricity as a port fuel source, we'd realize that LNG is not the best option for workers. Also, if we consider the best science available, we'd realize that harvesting, transporting, and burning LNG worsens air quality for workers and local residents more than simply keeping things they way they are (TOTE currently uses electricity when in our Port, producing zero emissions). I urge you to protect our health with true integrity, by comparing LNG for other reasonable alternatives in the port, including electrification.

{lease carefully reconsider the many negative health impacts of PSE's proposed LNG plant in Tacoma. After your careful review, I hope you learn that their dirty project does not have human health's best interests at heart, and you deny PSE the permits it seeks for this project. Thank you for your time and attention. I look forward to hearing from you.

Sincerely,
Rachael De Souza

1659-1 3. Outside of SEIS Scope

From: marilee dea
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 9:18:42 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I am a member of the Oregon Nurses Association's (ONA) . In 2018 House of Delegate's Statewide Convention overwhelmingly voted in support of a resolution to say NO to the Jordan Cove Liquified Natural Gas (LNG) This project presents an extreme threat to individuals and communities, including indigenous lands.
ONA is a professional association for nurses in Oregon. A non-profit association with over 12,000 members, ONA is a constituent member of the American Nurses Association. One of ONA's mission is to use collective power to advocate for healthy communities.
This LNG project poses a risk to clean safe drinking water which is just one of many dangers it poses to public health in Oregon and our region. The proposed LNG Facility's starting point is fracked natural gas wells throughout North America, both in the U.S. and Canada. Fracking injects a deadly mixture of water, known toxic chemicals, and sand under extremely high pressure up to two miles underground. Some of this toxic fluid remains underground, seeps into ground water and can contaminate drinking water.

Thank you for letting my share what the largest nurses association in Oregon feels about LNG and fracked gas. What happens to Washington will affect Oregon and visa versa-especially its role in climate catastrophe like we are seeing, feeling and breathing from Paradise California right now.

Marilee Dea
MSRN

marilee dea
marileedea@comcast.net
4613 NE Killingsworth #2
portland, Oregon 97218

0353-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Todd Deaminger

Address or email SDV98023@GMail.com

LNG is a fossil fuel IT very Bad for The planet.

Todd Deaminger
Disabled Veteran

1495-1 22. General Opposition

From: Toma Deavers
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:21 PM

Name: Toma Deavers
Email: Tomadeavers@gmail.com
Address: 10105 SE Hollywood Ave -
Milwaukie, Oregon 97222

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop the ridiculous plan to build a liquified natural gas refinery, storage and distribution center in the Tide flats area of Tacoma. This area is very prone to earthquakes and we all know the big one is coming, making this explosive facility a great danger to the community.
It is absurd to be adding such a fossil fuel emitter in this age of global warming catastrophe. WA people stayed indoors for 3-4 weeks this summer due to mega-fires caused by climate change. We do not need to be contributing to fossil fuel emissions by adding this LNG facility in Tacoma.
Please stop this LNG development as well as all future proposed LNG developments in WA for once and all.

1506-1 22. General Opposition

From: Toma Deavers
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:07 PM

Name: Toma Deavers
Email: Tomadeavers@gmail.com
Address: 10105 SE Hollywood Ave -
Milwaukie, Oregon 97222

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop this LNG facility from being built.

0572-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

The Kalama Methanol and Tacoma LNG projects must be stopped. A leak of gas on the Columbia River would create a dead zone killing wildlife and making the water dirty. As someone who loves to hike, swim, camp and Kayak, this would negatively impact my ability to enjoy the great outdoors.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA	Phone: (206) 909-9132

0573-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

The Tacoma and Kalama projects must be stopped to prevent the increas in climate change. As a young adult, I want my children to live on a safe planet without storms, ocean rises, and other ill-effects. Methane is an especially bad greenhouse gas & is leaked into the air during fracking. Bunker fuel from shipping will also contribute to climate change.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: (206) 909-9132

0574-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the chemicals used in fracking, transporting, and refining gas. I've heard many carcinogens are used (benzene, arsenic, lead, etc) in the process. Please include a study on the potentially dangerous chemicals used in fracking in the Final Supplemental Environmental Impact Statement. As a local who has lived throughout Oregon and Washington I'd appreciate the information.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA	Phone: 206-909-9132

0575-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

The fracking process appears unsafe from an engineering-perspective. As an engineer, I know products need to be meticulously studied & refined. Fracking causes pollution in the first two weeks when gas-filled water leaks out. I am concerned about this leakage and would like the process studied and the dangers highlighted. Please include this study in the Final Supplemental Environmental Impact Statement

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian Dethart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA	Phone: 206-909-9132

0576-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

The fracking process appears unsafe from an engineering-perspective. As an engineer, I know products need to be meticulously studied & refined. Fracking causes pollution in the first two weeks when gas-filled water leaks out. I am concerned about this leakage and would like the process studied and the dangers highlighted. Please include this study in the Final Supplemental Environmental Impact Statement

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian Dethart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA	Phone: 206-909-9132

0577-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I love the amazing Orcas that inhabit the Pacific Northwest. I would hate for leaked gas and chemicals in our air and water to kill off their population. Please include a study on how Orcas would be effected in the Final Supplemental Environmental Impact Statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98168	Phone: (206) 909-9132

0581-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about how our forests would be effected by the proposed projects. I love backpacking in the beautiful backwoods that surround us and would hate for them to be damaged. Please include a study on how our forest ecosystems would be effected by these projects in the Final Supplemental Environmental Impact Statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle	Phone: (206) 909-9182

2098-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

The Tacoma and Kalama projects must be stopped to prevent the increas in climate change. As a young adult I want my children to live on a safe planet with storms, ocean rises and other ill effects. Methane is an especially bad greenhouse gas & is leaked into the air during fracking. Bunker fuel from shipping will also contribute to climate change.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: (206) 909-9132

2099-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

The Kalama Methanol and Tacoma LNG projects must be stopped. A leak of gas on the Columbia River would create a dead zone, killing wildlife and making the water dirty. As someone who loves to hike, swim, camp, and Kayak, this would negatively impact my ability to enjoy the great outdoors.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	**Email:** bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	**Phone:** (206) 909-9132

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2135-1 3. Outside of SEIS Scope

I am concerned about how our forests would be effected by the proposed projects. I love backpacking in the beautiful backwoods that surround us and would hate for them to be damaged. Please include a study on how our forest ecosystems would be effected by these projects in the Final Supplemental Environmental Impact Statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: (206) 909-9182

2139-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I love the amazing Orcas that inhabit the Pacific Northwest. I would hate for leaks gas and chemicals in our air and water to kill off their population. Please include a study on how Orcas would be effected in the Final Supplemental Environmental Impact Statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: (206) 909-9132

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2140-1 3. Outside of SEIS Scope

The fracking process appears unsafe from an engineering-perspective. As an engineer, I know products need to be meticulously studied & refined. Fracking causes pollution in the first two weeks when gas-filled water leaks out. I am concerned about this leakage and would like the process studied and the dangers highlighted. Please include this study in the Final Supplemental Environmental Impact Statem

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian Dettart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: 206-909-9132

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2141-1 3. Outside of SEIS Scope

I am concerned about the chemicals used in fracking, transporting, and refining gas. I've heard many Carcinogens are used (benzene, arsenic, lead, in the process. Please include a study on the poten dangerous chemicals used in fracking in the Final Supplem Environmental Impact Statement. As a local who has lived throughout Oregon and Washington I'd appreciate the information.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Brian DeHart	Email: bddehart@gmail.com
Address: 10506 Rustic Rd S Seattle, WA 98178	Phone: 206-909-9132

2550-1 22. General Opposition
2550-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2550-3 14. LCA Inputs and Assumptions - Leakage/Slippage
2550-4 7. SEPA Alternatives
2550-5 7. SEPA Alternatives
2550-6 7. SEPA Alternatives

From: demian@everyactioncustom.com on behalf of Dr.Demian
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:00:07 AM

Dear Responsible Official,

Hi:

The IPCC has given us a clear warning that we must urgently STOP USING fossil fuels.

Fracked gas is BAD SCIENCE.

It pollutes throughout a watershed, and can have severe seismic repercussions.

Fracking allows unacceptable methane escapement.

The impact of methane on the climate is worse than previously thought.

Please revise the analysis to account for the following:

= Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

= Revise the analysis of the impacts of fracking in British Columbia based on recent research demonstrating that methane escapement has been dramatically under-estimated.

(Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.)

= Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

= Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals.

This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.

(https://researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106)

For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.

(https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf)

= This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for analyzing the life-cycle of the greenhouse impact of this project, and to conduct this more rigorous analysis.

Dr. Demian

Sincerely,
Dr. Demian
Seattle, WA 98146
demian@buddybuddy.com

1303-1 3. Outside of SEIS Scope
1303-2 8. No Action Alternative
1303-3 5. Regulatory Framework

From: margaret demick
To: Public Comment
Subject: Lng plant in Tacoma
Date: Tuesday, October 23, 2018 3:15:58 PM

To whom it may concerns,

This is a public comment for Puget Sound Energy's disastrous LNG project. PSE has shown its incompetence and its history needs to be included in the FEIS. Here are a few examples:

-You (the PSCAA) issued a notice of violation because PSE started construction without going through the agency's process. These small penalties do not affect big polluters like PSE.
-PSE did not evaluate tank safety & risks, only looked at small pipeline leaks
-PSE "safety recommendation" to handle leaks are for staff to wrap towels around leaks. LNG is
minus 260 and causes cryogenic burns or even death when in contact with the human body
-In 2016, a PSE gas line exploded and destroyed the Greenwood neighborhood in Seattle. They were fined . PSE has not taken care of the community after the explosion. How will they manage a dangerous situation with the LNG facility? Since they are a Limited Liability Corporation, they will most likely pack up their things and leave since they won't be held liable.
-PSE has constructed the LNG without the proper permits. How can we trust them to uphold the conditions of the air permit? They have completely disregarded the public including the ratepayers.

I hope the PSCAA grows a spine and does not allow this to go on any longer.

I am a Tacoma resident and taxpayer.

Sincerely
Margaret Demick
98407

Sent from my Sprint Samsung Galaxy S7.

1694-1 5. Regulatory Framework

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 7:45:15 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

No LNG Comment Countdown Day 8: Will you #StandWithPuyallup and demand the Clean Air Agency #HonorTheTreaties?

Submit your comment today! Copy the text below and paste in this link: http://350seattle.org/comment-clean-air/

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Sincerely,

Monica Denning
denning.mgg@gmail.com
17403

1810-1 4. Language

From: Alexis Derry
To: Public Comment
Subject: Re: the LNG Hearing Tuesday oct 30th
Date: Monday, October 29, 2018 4:46:36 PM

Hi,
The below article went out to Tacoma Pierce County Chamber of Commerce subscribers.
I wanted to write to strongly suggest that for future communications or articles, please describe **any** acronyms at the beginning of the article, and then it is ok to use the abbreviation from that point on. It is very frustrating and exclusionary to make the assumption that everyone knows what you are talking about….please never assume.
In the below article you use LNG and Draft SEIS ? I want to understand.

Thank you for your time, I hope you will give my comments some consideration.
Warmest regards
Alexis

ADVOCATE
FOR SOUTH SOUND JOBS

Join the Chamber in advocating for jobs in our industrial and maritime community at the LNG Hearing **Tuesday October 30th, 2:00-5:00pm and 6:30-10pm at the Rialto Theater**.

We expect a large turnout of people who are misinformed about LNG.

We need your voice to talk about the benefits – LNG replaces bunker fuel; LNG is better for air quality, and our region's economic well being, including businesses that utilize manufacturing, shipping, and logistics, depends heavily on the presence of a deep-water port.

If you cannot attend, please contact Puget Sound Clean Air Agency by November 21st and share your thoughts.

Talking points are:

- Environmental benefits of the conversion to LNG for both local and global air quality include 99% reduction in particulate matter, 90% reduction in nitrogen oxides, and 13.5% reduction in greenhouse gases as cited in the Draft SEIS
- Non-approval of the air permit would lead to increased dependence on diesel bunker fuel, which sends high levels of particulate and sulfur into our local air quality.
- We need to keep our Puget Sound ports competitive since ports around the world are building LNG facilities and the maritime industry is converting to LNG as the best available fuel to power their ships.

Learn more about the LNG Project here.

Alexis Derry
Marketing & Communications Coordinator
GLP Attorneys, PLLC
1420 South Union Avenue
Tacoma, Washington 98405
Phone: (253) 627-7701 Fax: (253) 627-4160
www.glpattorneys.com

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0352-1 22. General Opposition
0352-2 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name RACHAEL DESOUZA

Address or email desouza.rachael@gmail.com, 4002 S Park Ave Tacoma WA 98418

The draft supplemental environmental impact statement must be completed and especially consider the environmental and cultural impacts to the Puyallup Tribe and other Tacoma residents. The Puyallup Tribe has fishing rights as well as land rights in the Port of Tacoma. Constructing a tank will allow leakage of greenhouse gases that will damage health already struggling salmon, shellfish and other water beings. Culturally, the land and salmon are an essential part of the Puyallup people. Killing the Puyallup culture is equal to genocide. This cannot be allowed. Also, LNG tanks and transportation of fracked gas leaks greenhouse gases! These gases and ~~that~~ its sheer quantity make LNG in the port of Tacoma worse than coal in terms of clean air contamination. Take into account the long-term greenhouse gas effects on global warming using peer reviewed science. How long do we have ~~before~~ the Port is underwater due to sea level rise? Please consider these points. Please consider Puyallup culture. The earth and life on earth is at stake.

0347-1 22. General Opposition
0347-2 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Please provide the environmental effects of fracked gas over long term (20 plus years) in the SEIS.

The answer is renewable hydroelectric energy.

Environment and future are important. Let's move away from fossil fuels and toward renewable energy.

Name Ranae DeSouza

Address or email ranaedesouza@gmail.com
4002 S Park Ave, Tacoma WA 98418

A supplementary environmental impact statement is necessary for the proposed liquified "natural" gas storage tank that Puget Sound Energy wants to build in our port. I live a few miles from the proposed site (in the Lincoln Business District in South Tacoma) and I don't want gas fumes leaving into the air near me. It's our duty to protect the air around us, let alone all the air pollution caused by fracking to get the gas out of the earth. Fracked gas must be stopped! I am 38 years old and before I am old enough to retire from my job at the Tacoma School District the air in Tacoma will be too polluted for me to walk outside due to greenhouse gasses such as those loaded by fracked gas. We can't leave Tacoma residents and the Puyallup Tribe (who has title to the land under the proposed tank) pay the price for Puget Sound's corporate benefits. Please remember the children.

1480-1 22. General Opposition

From:	Sarah Deumling
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Monday, October 29, 2018 7:30:53 PM

Name: Sarah Deumling
Email: sdeumling@gmail.com
Address: 4550 Oak Grove Rd. -
Rickreall, Oregon 97371

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It is simple! We need to keep ALL FOSSIL FUELS in the ground if we want a livable planet, if we want to avert climate catastrophe. Please put people and our natural world that sustains us over corporate profit and do not allow this LNG facility. a little (or a lot) more money in some corporate person or stockholder's pocket is not worth further damage to our already suffering natural environment.

Sincerely,
Sarah Deumling
Family Forest Manager, mother and grandmother

1477-1 22. General Opposition

From:	Connor DeVane
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Monday, October 29, 2018 7:56:20 PM

Name: Connor DeVane
Email: connordevane@gmail.com
Address: 6104 NE 26th Avenue -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This illegal facility must be stopped. The site is on unceded Puyallup territory, backed by treaty law. The State of Washington and Governor Inslee claim to be climate leaders; please explain how this project is leading us towards a just trantion to renewable energy. The area is already a Superfund site. I have been there myself and have experienced the eye-burning, nostril torching, lung-inflaming air quality. There is no good argument for this project

1589-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1589-2 22. General Opposition
1589-3 13. LCA Inputs and Assumptions - Natural Gas Source

From: Felicity Devlin
To: Public Comment
Subject: LNG SEIS
Date: Friday, November 16, 2018 12:57:05 PM

To The Puget Sound Clean Air Agency:

Regarding the recent Supplemental Environmental Impact Statement for the LNG plant proposed for the Tacoma Tideflats: I am concerned that the SEIS does not effectively calculate the impact of greenhouse gas emissions. Firstly, the statement calculates the impact over 100 years. However, methane's heat-trapping capacity is much greater in the short term and then diminishes. A very short window is left us to reduce GHG emissions and avoid the worst impacts of GHG-caused climate change. Therefore, a net reduction over 100 years is not a useful finding when it is the next 20 or 30 years that are critical for reducing GHG emissions. We also know that the heat-trapping capacity of methane is much greater than the 2007 figure the SEIS uses. This figure may indeed be the one used by government agencies as we await an EPA update to reflect the latest findings of the IPCC, but the urgency of our current situation demands that the environmental impact statement use the figure we know to best reflect reality rather than government protocol. And furthermore, on the assumption that BC wells have a good record in preventing methane emissions, the SEIS calculates a net reduction in methane emissions only if the natural gas is sourced from British Columbia. And yet recent research indicates that emissions from gas wells in BC are much greater than previously reported.

The overwhelming evidence is that the SEIS has greatly underestimated the increase in methane emissions that will be caused by the LNG plant. I ask the Puget Sound Clean Air Agency to issue another draft environmental impact statement for public comment that is based on the best information currently available.

Sincerely,

Felicity Devlin
2417 N Washington St.
Tacoma, WA 98406

Carole: Thank you. Erin Dilworth?

Erin: Hi. My name is Erin Dilworth. I am the policy and technical program manager at Citizens for a Healthy Bay. And I live here in Tacoma. CHB reviewed the SEIS and found it to be alarmingly incomplete and misleading. I will be sending a longer, more detailed comment letter but wanted to speak today to give a quick summary of our findings.

[00:20:02] The following is a list of just a few of the issues CHB found with SEIS. 1) The SEIS uses outdated information. Why use global warming potential numbers from 2007, when we have updated information from the intergovernmental panel on climate change? I understand that the Washington Administrative Code is delayed in getting updated with current IPCC science. That does not preclude the Clean Air Agency from exploring these avenues and its analysis. It's as easy as changing an equation in your protected Excel spreadsheet. 2) The SEIS ignores near term climate change impacts.

Using the 100 year GWP for methane grossly underestimates the amount of climate changing pollution that will enter the atmosphere during the life of the facility. The 100 year GWP has no real scientific significance and is only mandated under the RCW for consistency across agencies.

[00:21:00] And that's not good enough for us. Again, the Clean Air Agency is not precluded from exploring alternatives in its analysis. It requires just a couple of clicks of the mouse to show what the near term impacts will be. 3) The SEIS is still using placeholder values. It's incomplete. A very important passage from the SEIS states, "Note that the emissions from the LNG facility plus upstream emissions are higher than those for the no action alternative. However, the carbon content of LNG results in lower end use emissions, so the net life cycle greenhouse gas emissions are reduced under most circumstances.

So, the entire conclusion that using LNG will result in lower end use emissions rests on the carbon content of that LNG. Your own analysis states that placeholder values are being used for the carbon content because you're still waiting on that information from PSE. So, the analysis is incomplete. And what are the circumstances when the net greenhouse gas emissions aren't reduced?

[00:22:00] 4) The purported greenhouse gas emissions reduction from this

1138-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1138-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1138-3 10. LCA Calculations
1138-4 13. LCA Inputs and Assumptions - Natural Gas Source

project also rests on one other huge assumption. That all of the methane gas will come from British Columbia and that BC's gas supply system produces less fugitive emissions than the US's. How is the Clean Air Agency going to enforce that? And what happens, in a likely scenario, that PSE can't obtain all of its gas from BC? The SEIS left out any analysis of impacts that would occur, if the gas came from the US network. That needs to be included, so that the analysis is based in reality.

Because of the significant data emissions and analysis choices that obscured the real impacts of this project, CHB requests that the analysis be done again. Use the best available science, look at the impacts over a range of timeframes, explore more than one alternative. Once the SEIS is complete, it should then be re-released for public review, and a new comment period should be opened. Thank you for taking the time to hear us today.

1138-4 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1138-5 22. General Opposition

2181-1 22. General Opposition

From: suedimasi@everyactioncustom.com on behalf of Sue Dimasi
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Saturday, October 27, 2018 11:21:47 AM

Dear Responsible Official,

Please don't ruin Puget Sound and the future of our coastal area. Fracking is not the only means of acquiring energy yet there are few means more dangerous to human health, the environment and the safety of the area and beyond. We need to eliminate the dangerous practice of fracking not increase the use of this process.

Sincerely,
Sue Dimasi
Modesto, CA 95350
suedimasi@comcast.net

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101

November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) TACOMA, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 65th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

0349-1 22. General Opposition
0349-2 8. No Action Alternative

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name LYNN DI NINO

Address or email LYNNDIN@MSN.COM

Besides being anti-pollution, besides not wanting more fuel-related industries in the Tideflats, I'm really concerned about the local government entities who let PSE build w/o permits in place! That certainly undermines our confidence in the democratic process. Rules apply to everyone?

Thank you,

Lynn Di Nino

1388-1 22. General Opposition

From: Melba Dlugonski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:17 PM

Name: Melba Dlugonski
Email: melbajade@hotmail.com
Address: 6735 SE 78th Ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I heard that if you tell a big enough lie, people are more likely to believe. I'm astounded. Fracked gas uses fossil fuel in it's extraction, pipe-building, all forms of movement. It leaks at all the points. Relaxed regulations coming to permit more flaring and leaking. Environments are destroyed.
Corrupt politicians will like your headline. The rest of us know better, but we have no vote.

No new fossil fuel infrastructure! We have an emergency to attend to.

1401-1 22. General Opposition

From: Melba Dlugonski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:04 PM

Name: Melba Dlugonski
Email: melbajade@hotmail.com
Address: 6735 SE 78th Ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

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No new fossil fuel infrastructure! We have an emergency to attend to.

1413-2 22. General Opposition
1413-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Melba Dlugonski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:53 PM

Name: Melba Dlugonski
Email: melbajade@hotmail.com
Address: 6735 SE 78th Ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I heard that if you tell a big enough lie, people are more likely to believe. I'm astounded. Fracked gas uses fossil fuel in it's extraction, pipe-building, all forms of movement. It leaks at all the points. Relaxed regulations coming to permit more flaring and leaking. Environments are destroyed.
Corrupt politicians will like your headline. The rest of us know better, but we have no vote.

No new fossil fuel infrastructure! We have an emergency to attend to.

1416-1 22. General Opposition

From: Melba Dlugonski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:43 PM

Name: Melba Dlugonski
Email: melbajade@hotmail.com
Address: 6735 SE 78th Ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I heard that if you tell a big enough lie, people are more likely to believe. I'm astounded. Fracked gas uses fossil fuel in it's extraction, pipe-building, all forms of movement. It leaks at all the points. Relaxed regulations coming to permit more flaring and leaking. Environments are destroyed.
Corrupt politicians will like your headline. The rest of us know better, but we have no vote.

No new fossil fuel infrastructure! We have an emergency to attend to.

1438-1 22. General Opposition

From: Melba Dlugonski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 7:52:00 PM

Name: Melba Dlugonski
Email: melbajade@hotmail.com
Address: 6735 SE 78th Ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I heard that if you tell a big enough lie, people are more likely to believe. I'm astounded. Fracked gas uses fossil fuel in it's extraction, pipe-building, all forms of movement. It leaks at all the points. Relaxed regulations coming to permit more flaring and leaking. Environments are destroyed.
Corrupt politicians will like your headline. The rest of us know better, but we have no vote.

No new fossil fuel infrastructure! We have an emergency to attend to.

0458-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I'm concerned about the danger to the inmates in the detention center.

Please include this in the final supplemental environmental impact statement.

Name: Susan Donaldson	Phone: (253) 536-9185
Address: 10311 Park Ave. South Tacoma 98444	Email: wrigdon88@hotmail.com

1476-1 22. General Opposition

From: Susan Donohoe
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 8:31:48 PM

Name: Susan Donohoe
Email: susanedonohoe@gmail.com
Address: 3012 SW Canterbury Ln -
Portland, Oregon 97205

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.
With that said, I am aware of several issues with the draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

1512-1 22. General Opposition

From:	Susan Donohoe
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, November 20, 2018 8:17:46 PM

Name: Susan Donohoe
Email: susanedonohoe@gmail.com
Address: 3012 SW Canterbury Ln -
Portland, Oregon 97205

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.
With that said, I am aware of several issues with the draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

1722-1 14. LCA Inputs and Assumptions - Leakage/Slippage

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 10:45:30 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models - independent analyses from show that fracked gas leakage rates are much, much worse.

Sincerely,

Desiree Douglass
dld@douglassconsulting.net
98177

1728-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 10:07:12 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency's analysis is based on 100-year, not 20-year, global warming potential (GWP) values. Given the IPCC report that was released last month indicating that we have 12 years to avoid climate catastrophe, the Clean Air Agency should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the "dirty fuel" it's supposed to replace.

Sincerely,

Desiree Douglass
dld@douglassconsulting.net
98177

1781-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 1:30:03 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Desiree Douglass
dld@douglassconsulting.net
98177

From:	Desiree Douglass
To:	Public Comment
Cc:	Desiree Douglass; Nanette Reetz; Nanette Reetz
Subject:	Submitting Comment on Draft SEIS for PSE"s proposed LNG project
Date:	Wednesday, November 21, 2018 11:57:13 PM
Attachments:	DC NEW LOGO small.jpg
Importance:	High

Dear Puget Sound Clean Air Agency,

I want to thank you for the Supplement EIS review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project is critical. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

As an environmental planner who has written EIS's and numerous EA's and SEPA Checklists over 20+ years, my first concern and comment on the Draft SEIS is that is that the No Action Alternative presented in the Draft SEIS is fictional. The No Action Alternative analyzed in the Draft SEIS represents the conditions at the site in 2016, not the current condition. This glaring flaw immediately invalidates the analyses and conclusions of the Draft SEIS because SEPA law requires a minimum of two valid alternatives, with one of them being a No Action Alternative. Let me explain. The Draft SEIS analyzes a No Action Alternative based on NO construction of PSE's proposed facility on the site. Yet PSE started construction at the site in 2016, despite not having a required "Notice of Construction" (NOC) permit from PSCAA.

PSCAA became aware of this violation in early 2017 and issued a Notice of Violation to PSE on April 12, 2017. PSE submitted a NOC application but did not stop construction. PSCAA did not issue PSE a NOC approval, yet apparently also did not take any further investigative or enforcement action on their Notice of Violation, despite repeated requests from the Puyallup Tribe to PSCAA to issue a Stop Work Order. PSCAA did accept PSE's NOC application and undertook this supplemental SEPA process. The result is that at the time of this draft SEIS being prepared, PSE has constructed an 8-million gallon concrete tank with massive subsurface supports at the site and related pipelines through the City to connect to the tank. This is NOT the condition that the Draft SEIS analyzes in the No Action Alternative.

To meet the minimum standard of SEPA law, PSCAA needs to analyze the environmental impacts and benefits of a variety of options in the No Action Alternative that address what to do with the 8 million gallon tank and infrastructure in the event that PSE's project does not become operational. This would have to include: demolition and repurposing of the tank, as these are the only reasonable "No Action Alternatives".

I have to tell you that in all my years of environmental permitting in Washington State, Texas, and California, I have never had a client permitted to continue construction without permits. If any client were to attempt something this rash, the agency in charge of the permit would shut construction down immediately. My most memorable experience was with Enron as they built their fiberoptic cable through Austin, Texas. Enron did not bother to get their local permits and the Austin City Environmental Department shut them down for weeks. The cost to the project was huge. It is the incentive and disincentive that keeps large corporations such as Enron from flagrantly ignoring local, state, and federal laws.

1908-1 8. No Action Alternative
1908-2 8. No Action Alternative
1908-3 8. No Action Alternative

My second Concern with the draft SEIS is that PSCAA did not engage in meaningful consultation with the Puyallup Tribe during the preparation of the SEIS. PSCAA is authorized to enact their permits through the EPA, a federal agency. With the authorization to implement EPA's laws and codes comes the responsibility to meet federal Treaty Law. The draft SEIS cannot be valid without this critical consultation between PSCAA and the Puyallup Tribe taking place. PSCAA needs to initiate consultation immediately and then prepare the Draft SEIS again.

My third concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

If you do this process correctly, consult with the Puyallup Tribe, analyze a valid No Action Alternative, and use the correct horizons and most current best available science, you will have a valid Draft SEIS. Then you should hold new public hearings, comment period before making any decision on PSE's application for an operating permit.

Sincerely,

1908-4 5. Regulatory Framework
1908-5 10. LCA Calculations
1908-6 12. LCA Inputs and Assumptions - Global Warming Potential Value
1908-7 12. LCA Inputs and Assumptions - Global Warming Potential Value
1908-8 19. LCA Inputs and Assumptions - End Use
1908-9 14. LCA Inputs and Assumptions - Leakage/Slippage
1908-10 13. LCA Inputs and Assumptions - Natural Gas Source
1908-11 14. LCA Inputs and Assumptions - Leakage/Slippage

Desiree Douglass

Environmental Planning & Design
Desirèe L Douglass
3518 Fremont Avenue North #289
Seattle, WA 98103
mobile: 360-220-1422
dld@douglassconsulting.net
www.douglassconsulting.net

Name Barbara Dow

most low sulfur fuel
requirements.

~~pollute, permit it~~

The proposal is not being taken accurately shown by the many flaws in the SEIS analysis, such as PSE's own reports that document that some of their produced, a substantial 25%+, comes from US source while the analysis accepts that assertion that they will use only Canadian gas, the assumption that recent regulations will be implemented and enforced completely almost immediately, and that it doesn't appear to undervalue the LNG shipping industry, meeting current quarantine assumptions about how ships may

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

I have learned a lot from the Jordan Cove, OR, proposal and arguments, and know that if built, it would become the largest air polluter with C in Oregon. The Tacoma proposal shares many of the same features. I am therefore concened that it will be a major (Check here to continue comments on the other side). ✓ →

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Barbara Dow Email: bdowpdx@gmail.com

Address: 4914 NE 24th Ave, Portland, OR 97211

By signing this comment card you agree to receive updates about the project.

Name Barbara Dow

Both the facility operator and the PS Clean Air Agency agree that the project would emit (besides methane & CO_2) potentially dangerous compounds into the air, like cadmium, arsenic, SO_2. The community must not be impacted with more than one hazardously dangerous target community.

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

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Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,

I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Treaty rights cannot be ignored or downplayed - in recent cases, they have been both legally & morally strong. Water, and even sand, needed for project, are already becoming scarcer. Water, especially, is too valuable a resource for such use. (Check here to continue comments on the other side). ✓

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Barbara Dow Email: bdowpdx@gmail.com

Address: 4914 NE 24th Ave, Portland, OR 97211

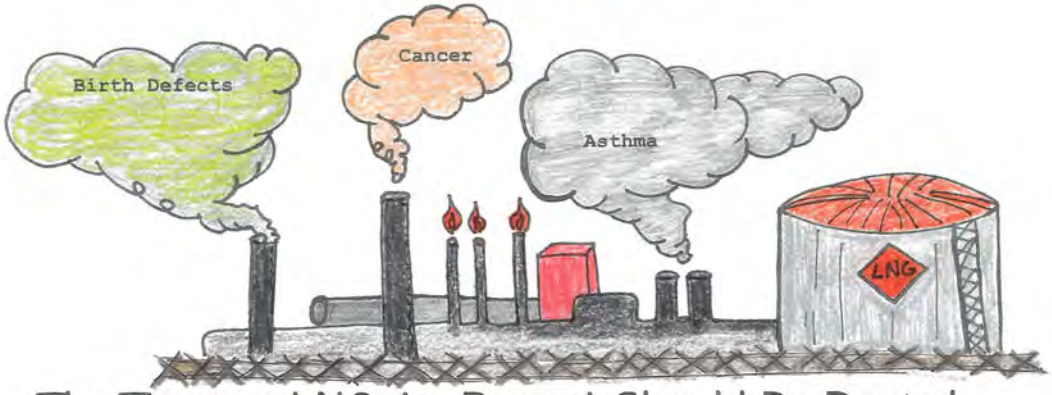
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NOV 14 2018
Puget Sound
Clean Air Agency

0751-1 22. General Opposition

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.
Please Value People Over Corporate Profits!

Name For Archer Downie by his Grandmother Age 3

1968-1 23. General Support

From: Dawn Doyle
To: Public Comment
Subject: LNG Plant
Date: Tuesday, October 30, 2018 1:48:04 PM

Please count on my support of the LNG Plant in the Port of Tacoma. The Port of Tacoma needs LNG fuel to stay competitive. It will save our Port, our economy and our jobs.

Dawn Doyle

1225-1 23. General Support

Steve: Thank you.

[05:48:00] So, next is Tara Doyle-Ennekin.

Tara: Good evening and thank you so much for this opportunity. My name is Tara Doyle-Ennekin. I'm a long time Salmon Beach resident and a business owner. After 17 years doing business in Tacoma, I have been simultaneously pleased and disappointed in the actions of some local leaders and community organizations, when it comes to the construction of an LNG facility, at the Port of Tacoma. The recently released draft SEIS confirmed my expectation that the use of LNG for the maritime sector would result in better air quality for those of us who live and work around here.

Also, expected, but still frustrating, is the refusal of local activists to embrace scientific study, not just the studies they like and acknowledge.

[05:49:00] But while they might not yet have their preferred answer to transportation fuels on the scale required for today's global economy, there is a step in the right direction that has real meaningful benefits. And here in Tacoma, the rest of us would like to get it started. I'm a professional and a responsible member of this community. It is disheartening to be assumed to be anti-environment because I support the construction of the LNG facility.

Frankly, it isn't right that a small minority of people can out shout a reasonable majority who are also concerned about clean air, safe water, and preserving habitat but also recognize that, in the spirit of making progress, you cannot sacrifice the good for the sake of the perfect. If all of our cars ran on garbage and ships could operate on solar batteries starting tomorrow that would be wonderful. But it isn't reality. Furthermore, I am frustrated by the fantasy that everyone will, ultimately be satisfied without controversy.

If we just continue to delay construction and conduct more studies, the reality is every day we spend talking about this, instead of moving forward, is another day we could have reduced emissions and didn't.

[05:50:10] For this project, delay equals reduced air quality. Will activists ever acknowledge that their challenges increase harmful emissions

by impeding progress? No. They only take credit for stopping something offering no equal realistic alternative in its place. We are told repeatedly that the clock is ticking on environmental health and safety, and yet, it is so-called environmentalists who have barred the door towards making a step in the right direction. I hope that the decision makers, on this project, recognize that no matter what they say, it is green activists who are upholding decreased air quality in our city, not science.

As a community, we either support the engineers, scientists, and biologists who evaluate projects and move forward based on their findings, or we allow ourselves to spiral based on conspiracy theories and non-science base gossip.

[05:51:00] I support the professionals who have applied their expertise to this project and who have found environmental benefit in the form of better air quality and reduced greenhouse gas emissions. For the love of this place where I live and work, I want you to get started. In close, I hope you see past the red tape, move this project and our healthier environment forward. Thank you so much.

1962-1 23. General Support

From: Tara Doyle-Enneking
To: Public Comment
Subject: LETTER FOR CONSIDERATION
Date: Monday, November 19, 2018 5:08:34 PM

Puget Sound Air Agency,

I attended the public hearing on 10/30 and had a chance to make public comment. I would also like to submit my testimony in writing to your agency for consideration.

Please find letter attached.

Thank you very much!

Tara Doyle-Enneking
doyle.enneking@gmail.com
Mobile: (425)941-6361

tpcbusinessalliance@gmail.com
www.tpcbusinessalliance.com

PSCAA LETTER

1832-1 22. General Opposition

From: omamarie@everyactioncustom.com on behalf of Marie Driscoll
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 6:58:28 AM

Dear Responsible Official,

Just another chance to ruin the planet for everyone else.

Sincerely,
Marie Driscoll
Lees Summit, MO 64081
omamarie@att.net

2208-1 22. General Opposition

From: rduggan01@everyactioncustom.com on behalf of Ryan Duggan
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 11:53:06 AM

Dear Responsible Official,

We must urgently move away from fossil fuels.
Please do all that you can to reduce the negative impacts of fracking upon the environment and promote green energy usage.

Sincerely,
Ryan Duggan
Saugus, MA 01906
rduggan01@northshore.edu

1714-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 4:50:06 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

This is not clean energy, and it's too dangerous! Listen to the indigenous people!

Sincerely,

Jennifer Durham
info@jenniferdurham.com
98133

2180-1 3. Outside of SEIS Scope

From: becky@everyactioncustom.com on behalf of Rebecca Durr
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Saturday, November 3, 2018 1:32:11 PM

Dear Responsible Official,

This proposed LNG project is another step toward climate chaos at a moment when we must urgently move away from fossil fuels.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

Accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which should be sufficient basis for denial of the Notice of Construction application.

In addition, please consider the location adjacent to a precious waterway as well as residences and other activities of the urban area surrounding it. Besides potential to foul air and water, in case of accidents Immediate potential harm to people and property should be the reason for denial. Innocent people need to be protected from this kind of industry in their neighborhood.

Thank you for your time and consideration of these comments.

Sincerely,
Rebecca Durr
Aberdeen, WA 98520
becky@durrweb.com

1895-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

I would like the planet to remain habitable. We need to discontinue further reliance of carbon emitting fuel sources. Lets start being more responsible for the sake of our children and grandchildren

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Dave Eboagh Email: david.j.eboagh@gmail.com

Address: 1409 NW 23rd Ave Portland, OR 97212

By completing this comment card you agree to receive updates about the project.

1893-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

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NOV 19 2018
Puget Sound
Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

40 year plan despite dire climate crisis
our fuel mix needs to be changed in the next 12 years.
We need to dismantle to gas infrastructure, not stay locked into it for the next 40 years. Make a plan to wean off not continued dependence.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Dave Ebaugh Email: david.j.ebaugh@gmail.com

Address: 1409 NW 23rd Ave Portland OR 97210

By completing this comment card you agree to receive updates about the project.

1539-1 22. General Opposition

From: cpup6501@everyactioncustom.com on behalf of Carol Eckert
To: Public Comment
Subject: Comment OB Tacoma LNG SEIS Project
Date: Wednesday, November 21, 2018 11:11:18 PM

Dear Responsible Official,

We must urgently move away from fossil fuels. They are dirty non renewable fuels.

We need to become leaders in using renewable energy and developing jobs in that area.

Let's not follow the short term carrot. We will suffer in the meantime.

We need to preserve our bounty and beauty of Puget Sound and not be seduced by a quick fix.

Thank you for your time and consideration of these comments.

Sincerely,
Carol Eckert
Tacoma, WA 98466
cpup6501@aol.com

1341-1 22. General Opposition

From: Monica Eckrich
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, November 18, 2018 7:11:14 AM

Name: Monica Eckrich
Email: Mceckrich@gmail.com
Address: 2322 SE 59th avenue -
Portland, Oregon 97215

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop this project! For so many reasons this pipeline should not built. Built in fragile ecosystem, contamination of soil, air, and ground water is inevitable. It is dangerous and does not support a better plan for addressing climate change. Most importantly, this illegal pipeline does not have permission to be built on land owned by the Puyallup Tribe. This is not a better solution.

2545-1 22. General Opposition
2545-2 3. Outside of SEIS Scope
2545-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2545-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2545-5 7. SEPA Alternatives
2545-6 7. SEPA Alternatives

From: fh@everyactioncustom.com on behalf of Marianne Edain
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 3:54:38 PM

Dear Responsible Official,

I am a daily victim of PSE, being a "customer" (hostage, really) of PSE's monopoly electric service. While PSE spends our ratepayers' payments to tout its greenwashed image, it actually generates nearly 60% of its electricity from fossil fuels. Not very green. Most of the balance comes from hydro, which is damaging our salmon. There are alternatives, but PSE is less than interested. Instead, it is moving forward with construction of its Tacoma LNG project even before review and permits. After all, better to ask forgiveness than permission, right?

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency. There is now clear evidence, a provided by Snohomish PUD, that solar installations and home retrofitting are in fact reducing the need for more electricity.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-

5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Marianne Edain
Langley, WA 98260
fh@whidbey.com

1792-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:30:30 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

To Whom it May Concern,

Not only is fracking bad for our air quality, but it contributes to greenhouse gas emissions which further erode our environment contributing to increased temperatures in the environment and accelerating global climate change.

I am not in favor of fracking for natural gas.

Sincerely,

Suzanne Edison
seedison@seanet.com
98122

From:	Kristin Edmark
To:	Public Comment
Subject:	Puget Sound Energy LNG Project
Date:	Wednesday, November 21, 2018 2:55:10 PM

Thank you for the opportunity to comment on the draft SEIS for the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I feel that the report should be reissued after better assessing scientific data.

1) Data now reveals the gravity of greenhouse emissions. These emissions must be taken seriously. LNG is primarily methane which is a potent greenhouse gas. The 100 year life of methane is incorrect in this study for 2 reasons. First, it has become clear that 100 years are not available to prevent massive species die off, but more importantly, because the decrease in potency of methane is not linear, mathematically the use of the 100 year value is incorrect and skews values. The 20 year values of methane would be more closely reflect actual impact.

2) It cannot be assumed that the LNG will always come from Canada. I do not believe that the pipelines in Canada have a different leakage than in the US. Values provided by the oil and gas industry or by pipeline companies should not be trusted unless corroborated by independent sources without bias. Most values are listed for new well functioning pipes. Ruptures happen. A realistic rupture value should be included for pipelines. Methane is a very small molecule which escapes easily especially when pressurized. Leakage at pumping stations should be considered in the totals.

3) I am very concerned about the disruption caused by pipeline paths. Clear cutting of trees is necessary everywhere the pipeline crosses forests. Trees absorb greenhouse gasses. Everywhere a pipeline crosses a natural waterway, there is increased chance of breakage, clear cutting disrupts wild life, erosion muddies water affecting marine life, there is a risk of water contamination, etc.

4) I am very concerned about diesel particulate and compounds from fracking going into the air in Tacoma, during transport and at the fracking sites. These heavy metals, diesel particulates and sometimes radioactive compounds are unhealthy especially for children and elderly.

5) This project encourages fracking which has been shown to leak dangerous compounds into water supplies. As fracking sites age they are more likely to leak. It is common for fracking sites to be sold to smaller producers which decide not to even cap them properly releasing methane continuously into the air and allowing easier flow into water tables as drilling sites erode.

6) Sea level is rising. The site is low and will have an ever increasing chance of unwanted flooding or run off.

7) It is wrong not to allow the Puyallup voice over their lands.

8) The shipping unburned exhaust slippage rate should reflect currently accepted values. Present draft SEIS values are not aligned with current research.

1668-1 19. LCA Inputs and Assumptions - End Use
1668-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1668-3 13. LCA Inputs and Assumptions - Natural Gas Source
1668-4 3. Outside of SEIS Scope
1668-5 3. Outside of SEIS Scope
1668-6 3. Outside of SEIS Scope
1668-7 3. Outside of SEIS Scope
1668-8 5. Regulatory Framework
1668-9 14. LCA Inputs and Assumptions - Leakage/Slippage

9) Environmental impact of end use of the product should also be considered. This project does not exist in isolation. Final use impact affect climate and emissions as much as the site itself.

In this time when Washington should be striving to decrease it's greenhouse gas emissions and working toward 100% renewable energy, this massive new fossil fuel infrastructure is not aligned to state goals and is not appropriate for Washington State. The impacts of accelerating climate change are important from massive wildfires to protecting fragile ecosystems vulnerable to accelerated climate change. Clean energy projects produce more jobs benefits more individuals and keeps more money inside Washington State. Please rewrite the draft SEIS to better reflect true impacts.

Sincerely submitted,
Kristin Edmark MPH RD

0752-1 22. General Opposition

RECEIVED
NOV 14 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Leonard Edwards II Age 37

0561-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please do the right thing for your constituents. The Kalama methanol refinery will not only require a pipeline that crosses your constituents land and ~~water bodies~~ but also the fracked gas is being used in other countries. This, ~~is~~ please consider the impacts of ~~your~~ the needs of your constituents before the needs of a ~~for~~ outside company and foriegn countries. Your constituents need a livelihood such as fishing and by building the refinery and subsiquent pipeline you are impacting your own constituents livelihoods. Please consider those impacts in the proposal.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Eggerweiler	Email: saeggerweiler@gmail.com
Address: 320 NE 123rd St, Seattle WA	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please understand that when companies make the claims that fracked gas pollutes less then coal, that ignores the fact that methane, the main component of fracked gas is 86 times more warming that carbon dioxide, considering a 20 year period. Even the EPA recently has said that we can predict that at current levels we are looking at a 4°C temperature increase in global atmospheric temperature. We all know that, that temperature increase is going to have huge impacts on people everywhere. Don't be the Agency that approves a plan that will only add to this global warming. Please consider the impacts of methane on global warming in the environmental impact statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Egger-Weiler	**Email:** Saeggerweiler@gmail.com
Address: 320 NE 123rd St, Seattle WA	**Phone:**

0562-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Even if fracked gas potentially emits less carbon dioxide then coal, the amount of water contamination is ~~wrong~~ much higher and that will impact so many lives of people who live nearby. We cannot allow projects that poison peoples water and potentially impact their health. We have already ~~got~~ experienced that in Flint and other places. Drinking water contamination is not an option.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Egger	Email: Saeggemeier@gmail.com
Address: 320 NE 123rd St, Seattle WA	Phone:

0563-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Even if ~~the~~ LNG and methenol are only two facilities, we know especially methanol in Kalama would require another pipeline. We have already seen pipelines leak and creeck. We cannot approve a project that would allow for more Statewide affected leaking pipelines. Please recognize those impacts in an environmental impact statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Fegger-neiter	Email: saeggerweiler@gmail.com
Address: 320 NE 123rd St Seattle WA	Phone:

0564-2 22. General Opposition
0564-2 14. LCA Inputs and Assumptions - Leakage/Slippage

0565-1 11. LCA Inputs and Assumptions - General

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

even though the LNG facility and methonal refineries say that fracked gas is a bridge fuel, that is not considering all the ways that fracking actually pollutes, only the direct emissions from burning it. If we include all life cycle emissions from transportation of water, chemicals, materials and production of plastics, fracked gas will produce more emissions! The impacts of all those potential emissions need to be considered in an environmental impact before approval.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Eggerweiler	Email: saeggerweiler@gmail.com
Address: 320 NE 123rd st Seattle WA	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please understand that when companies make the claims that fracked gas pollutes less then coal, that ignores the fact that methane, the main component of fracked gas is 86 times more warming that carbon dioxide, considering a 20 year period. Even the EPA recently has said that we can predict that at current levels we are looking at a 4°. temperature increase in global atmospheric temperature. We all know that, that temperature increase is going to have huge impacts on people everywhere. Don't be the Agency that approves a plan that will only add to this global warming. Please consider the impacts of methane on global warming in the environmental impact statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Egger-Weiler	Email: saeggerweiler@gmail.com
Address: 320 NE 123rd St, Seattle WA	Phone:

2052-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2053-1 3. Outside of SEIS Scope

Please do the right thing for your constituents. The Kalama methanol refinery will not only require a pipeline that crosses your constituents land and ~~[illegible]~~ but also the fracked gas is being used in other countries. This ~~is~~ please consider the impacts of ~~your~~ the needs of your constituents before the needs of a ~~for~~ outside company and foriegn countries. Your constituents need a livelihood such as fishing and by building the refinery and subsequent pipeline you are impacting your own constituents livelihoods. Please consider those impacts in the proposal.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Eggerweiler	Email: saeggerweiler@gmail.com
Address: 320 NE 123rd St, Seattle WA	Phone:

2057-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Even if ~~that~~ LNG and methenol are only two facilities, we know especially methanal in Kalama would require another pipeline. We have already seen pipelines leak and crack. We cannot approve a project that would allow for more Statewide affected leaking pipelines. Please recognize those impacts in an environmental impact Statement.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Egger-Weiler	Email: saeggerweiler@gmail.com
Address: 370 NE 123rd St Seattle WA	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2059-1 3. Outside of SEIS Scope

Even if fracked gas potentially emits less carbon dioxide then coal, the amount of water contamination is ~~wrong~~ much higher and that will impact so many lives of people who live nearby. We cannot allow projects that poison peoples water and potentially impact their health. We have already ~~got~~ experienced that in Flint and other places. Drinking water contamination is not an option.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Egger	Email: Saeggerwriter@gmail.com
Address: 320 NE 123rd St, Seattle WA	Phone:

2060-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

even though the LNG facility and methonal refineries say that fracked gas is a bridge fuel, that is not considering all the ways that fracking actually pollutes, only the direct emissions from burning it. If we include all life cycle emissions from transportation of water, chemicals, materials and production of plastics, fracked gas will produce more emissions! The impacts of all those potential emissions need to be considered in an environmental impact before approval.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Sarah Eggerweller	Email: saeggerweller@gmail.com
Address: 320 NE 123rd st Seattle WA	Phone:

2210-1 22. General Opposition

From: franein@everyactioncustom.com on behalf of Frannie Ein
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 11:03:16 AM

Dear Responsible Official,

My family strongly opposes the building of the 14 story tall liquified natural gas (LNG) project in Tacoma. The climate impact of the dirty process of extracting fracked gas threatens Tacoma, the nearby Puyallup tribe and the stability of our planet.

Sincerely,
Frannie Ein
Seattle, WA 98118
franein@comcast.net

2549-1 22. General Opposition
2549-2 3. Outside of SEIS Scope
2549-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2549-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2549-5 7. SEPA Alternatives
2549-6 7. SEPA Alternatives

From: relam@everyactioncustom.com on behalf of Richard Elam
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:33:07 AM

Dear Responsible Official,

First this thing is a giant bomb waiting to go off if there is a mistake by the under trained, under paid and over worked people you are going to have running the place.

Second this is not how to slow down Climate Change by embracing just another form of Fossil Fuel. We must stop this push to extract, sell and burn as much fossil fuel as possible as fast as we can plan.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Richard Elam
San Diego, CA 92117
relam@ucsd.edu

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101

November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) TACOMA, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

2535-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2535-2 14. LCA Inputs and Assumptions - Leakage/Slippage
2535-3 3. Outside of SEIS Scope
2535-4 7. SEPA Alternatives

From: wally.elton@everyactioncustom.com on behalf of Wallace Elton
To: Public Comment
Subject: Comments against Tacoma LNG SEIS Project
Date: Sunday, October 21, 2018 3:59:46 PM

Dear Responsible Official,

First, why has construction on such a clearly controversial project been allowed to start without an environmental review? Better late than never in the case of considering environmental impacts, I suppose.

Our planet and country, and most especially the beautiful Puget Sound area, will be harmed by this project. As the very recent UN report emphasized, we need to take big steps immediately to reduce greenhouse gas emissions and shift to clean energy sources if we wish to avoid major threats from climate change. Apparently, Puget Sound Energy and Tote Marine either have not heard of this report or are ignoring it, because their proposed project would be the exact opposite of what we all need. Indeed, the LNG project would instead be another step toward climate chaos. This is not a local issue; it is a global one. All agencies with power such as you have must begin now to act accordingly.

And that does not even consider the water pollution and public health concerns that surround fracking around the sites where it occurs and that have caused some locales to ban the process.

Even if fracked gas were a "lesser evil" (which it is not due to methane release, as science has been revealing), evil is still evil. And undesirable.

While I appreciate that you are assessing the the greenhouse impacts of this project over its life, I call upon you to revise the analysis to account for additional factors. These include:
*That methane gas should be considered 86 times more potent than carbon dioxide based on the current IPCC analysis (AR5 rather than AR4) over a 20-year timeframe (rather than the 100-year.
*That recent research has shown that methane escapement in fracking has been dramatically under-estimated, which requires modification of the analysis of the effects of fracking in British Columbia.
*Including a "clean energy alternative" that calls for PSE to provide electricity from renewable sources and with improved energy efficiency rather than from a different fracked gas source.
* Revising the “no-action alternative” to assume that Tote Marine will reduce greenhouse gas release by 50% in keeping with the International Maritime Agency’s established goals. Such a reduction might also be reached through a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion, or other alternatives besides fracked LNG. Tote Marine can also achieve essentially all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.

I believe that this more rigorous and accurate analysis will indicate that the project would have a significant and unmitigated impact on our global climate. That fact alone should be sufficient to justify denial of the Notice of Construction application.

Thank you for considering my comments.

Sincerely,
Wallace Elton
Saratoga Springs, NY 12866
wally.elton@earthlink.net

From: Pete Erickson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 10:18:52 AM
Attachments: Erickson_Tacoma_LNG.PDF

To Whom it May Concern:
Attached please find a letter of comment on the DSEIS for the Tacoma LNG Project.

Sincrely,
Peter Erickson

Pete Erickson
Senior Scientist
pete.erickson@sei.org
+1 (206) 547-4000 ,3#
Stockholm Environment Institute
1402 Third Avenue, Suite 900, Seattle, WA 98101, USA

1402 Third Ave, Suite 900
Seattle, WA 98101, USA
pete.erickson@sei.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
publiccomment@pscleanair.org

November 20, 2018 (via email)

To Whom it May Concern:

I am writing concerning the Draft SEIS for the proposed Tacoma LNG Project.

In particular, I am writing to comment on the assumptions used for the assessment of greenhouse gas emissions – especially fugitive methane (CH_4) -- associated with production of the natural gas to be used by the Project.

Appendix C to the SEIS is titled "PSE Tacoma LNG Project GHG Analysis Report", and contains a report by Life Cycle Associates titled "PSE Tacoma LNG Project GHG Analysis Report", dated September 20, 2018. All references to table numbers or page numbers in my comments here refer to that Life Cycle Associates report.

As described in Table 3.6 (page 56) of the Life Cycle Associates report, their upstream GHG analysis for natural gas relies on three data sources: GHGenius for their "baseline" case, a BC Inventory for their "lower" case, and the GREET model for their "Upper" case.

All three of these data sources are flawed for the purpose of accurately assessing the upstream GHG emissions associated with provision of natural gas.

The most critical flaw in all three of the estimates used in the SEIS is that they rely on "bottom-up" estimates of methane loss drawn from measurements or default assumptions of specific pieces of equipment, rather than from "top-down" or hybrid approaches that take into account all methane releases, especially those releases that occur during abnormal operating conditions.

As reported in the literature in both the United States and Canada, measurements of methane leakage that capture the entire range of operating conditions – not just the ideal conditions often observed in bottom-up studies – find rates of fugitive CH_4 loss that can be many times higher than those from bottom-up studies.[1–3] In particular, a recent comprehensive assessment published in the journal *Science* finds that upstream methane emissions across all U.S. gas and oil supply average 2.3% of gross U.S. gas production.[1] I see little reason why emissions from Canadian operations can yet be found to be confidently below this value.

In the table below, I provide further commentary on the three methane loss rates used in the Life Cycle Associates assessment.

SEIS Scenario	**Data Source reported for methane loss rate**	**Methane loss rate reported by Life Cycle Associates in Table B.3**	**Primary source of that leakage rate**	**Problems with that leakage rate**
Baseline	GHGenius 4.03	0.32%	Canadian Association of Petroleum Producers inventory from the year 2000[4]	An industry-reported methane loss rate from 18 years ago is inappropriate because research since has demonstrated that actual fugitive methane loss rates have consistently been many times higher than bottom-up estimates from industry. The "G7 Study", cited to further justify this low methane loss rate, is inappropriate because the authors of this unpublished study, which took place in Alberta (not BC as claimed), report that those were "unique conditions" that "cannot be extrapolated to any other operator or region" (personal communication with the authors).
Lower	BC Inventory	0.4%	British Columbia's greenhouse gas inventory	BC's inventory is a bottom-up approach that misses large quantities of fugitive methane[5]
Upper	GREET 2017	1.0%	U.S. EPA national greenhouse gas inventory	The US EPA inventory is known to underestimate fugitive CH_4 losses. A better estimate would be 2.3% from Alvarez et al.[1]

Please contact me if I can provide further details regarding methane loss rates, including any of the studies referenced here.

Sincerely,

Peter Erickson
Senior Scientist
Stockholm Environment Institute (SEI)

References Cited

1. Alvarez, R. A. *et al.* Assessment of methane emissions from the U.S. oil and gas supply chain. *Science* eaar7204 (2018). doi:10.1126/science.aar7204
2. Brandt, A. R. *et al.* Methane Leaks from North American Natural Gas Systems. *Science* **343**, 733–735 (2014).
3. Johnson, M. R., Tyner, D. R., Conley, S., Schwietzke, S. & Zavala-Araiza, D. Comparisons of Airborne Measurements and Inventory Estimates of Methane Emissions in the Alberta Upstream Oil and Gas Sector. *Environ. Sci. Technol.* **51**, 13008–13017 (2017).
4. (S&T)2 Consultants Inc. *GHGenius Natural Gas Pathway Update*. ((S&T)2 Consultants Inc for Natural Resources Canada, 2012).
5. Skuce, A. B.C. lowballing fugitive methane emissions from natural gas industry. *Critical Angle* (2015).

1801-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:55:56 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

No PSE's LNG project!

Sincerely,

Diana Esperanza
dianatwin2012@gmail.com
98387

1295-1 22. General Opposition

November 17, 2018

To; Puget Sound Clean Air Agency

Re: Opposition to PSE's construction of an LNG plant on the Tacoma waterfront

Dear Smart People,

Have you seen the floods in the Philippines, the floods in Louisiana, the flooding in Houston? Or the flooding and hurricanes in Georgia and South Carolina? Or the flooding and hurricanes in Florida? Or the devastation of the entire Island of ~~the~~ Puerto Rico? With these facts, it doesn't take a very smart person to figure out that we don't need anymore of this crap... especially methane.

Please do the right thing and get out of your ergonomic chairs and don't permit this climate-killer LNG be functional. Think of your kids and your cute, little grandchildren. Give them a chance. Please, please, please. Be on the right side of God's creation. You know what's right.

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Bruce Falzarano
5950 17th Ave. SW
Seattle, WA 98106

1257-2 22. General Opposition
1257-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

November 19, 2018

RECEIVED
NOV 3 1 2018
Puget Sound
Clean Air Agency

TO: The Commissioners of the Puget Sound Clean Air Agency

Request for denial of air quality permit for PSE LNG Project.

Considering the serious environmental hazards in the production, transportation, and storage of methane, the central component of LNG; and, considering your report does not incorporate the best available Global Warming Potential science on methane, the report's conclusions are, at best, incomplete. In actuality, the report has grossly misrepresented and underestimated the staggering climate pollution the PSE LNG project would create. Please deny any air quality permit.

Thank you for your diligence.

Madeleine Falzarano

Madeleine Falzarano

5950 17th Avenue SW

Seattle, WA 98106

1565-1 22. General Opposition

From: Marie Farren
To: Public Comment
Subject: Fracking
Date: Thursday, November 15, 2018 4:04:29 PM

We here in Tacoma believe another future is possible - one powered by renewable energy and providing a safe environment and climate for all. We also believe in truth and transparency. That is why we are opposing Puget Sound Energy's Liquefied Natural Gas refinery, storage and distribution facility being built in our port. They tried to sneak it in, but when that failed they hit us with an avalanche of green washing and misleading information. But we know the truth - it is bad for us, bad for Tacoma, and bad for the climate.

The Puget Sound Clean Air Agency (PSCAA) is reviewing the climate impacts of this project and have released their draft study (an SEIS, or Supplement Environmental Impact Statement) on its climate impacts. **It is our duty now to ask the right questions** to strengthen this study and make sure the PSCAA never issues an operating permit to Puget Sound Energy.

Marie Farren

1902-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

PSE – If you haven't noticed, the electric grid does not leak. And ocean-going vessels are excellent candidates for battery ballast electric drive. Think of submarines from 1930. You really don't need the methane grief, its only going to get worse.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Tracy Farwell Email: farwellt@msn.com

Address: PO Box 86449, Portland, OR

By completing this comment card you agree to receive updates about the project.

1289-1 22. General Opposition

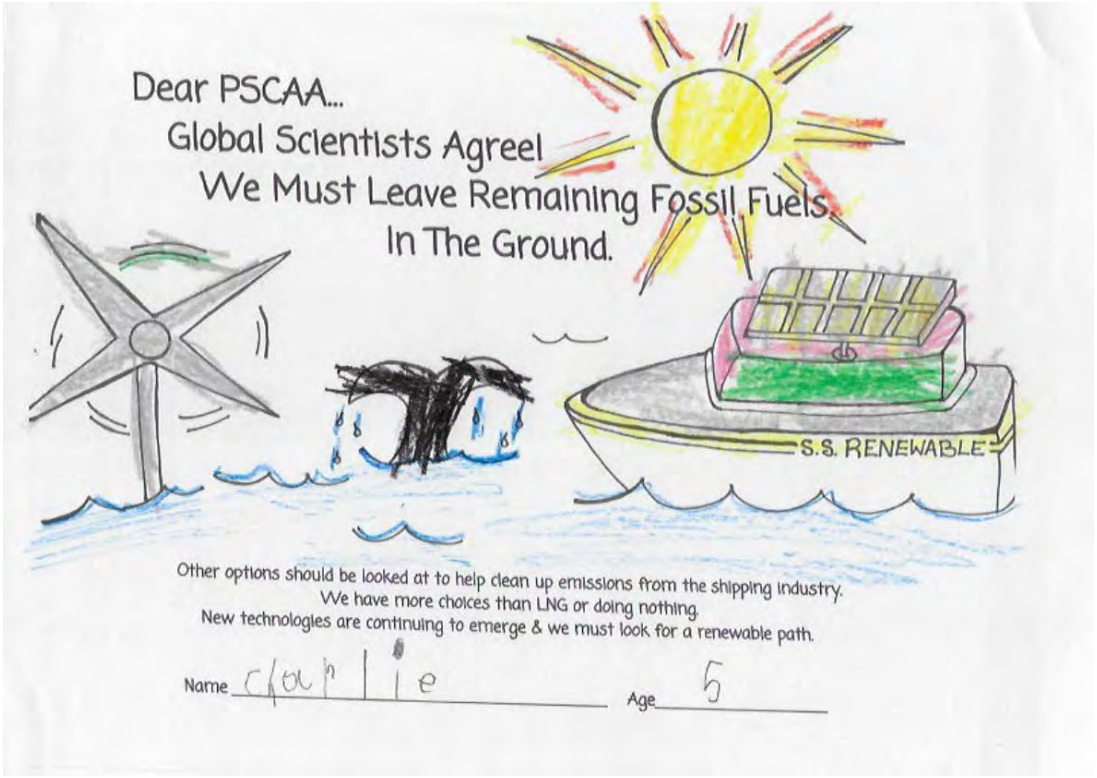
From: CINDY FEIST
To: Public Comment
Subject: Tacoma LNG
Date: Monday, November 19, 2018 6:41:24 PM
Attachments: Kids pictures 2.pdf

Dear PSCAA:

My three grandkids, aged 5, 11, and 13, are old enough and aware enough to know that climate change will impact and alter their lives. They wish to provide the attached public comment regarding PSE's proposed LNG project in Tacoma.

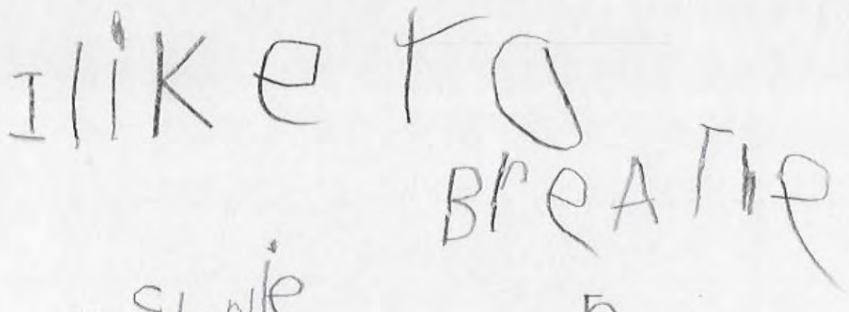
We all live in Tacoma and oppose the PSE refinery.

Sincerely,
Cindy Feist
Alaina Spaulding
Margaret Spaulding
Charlie Spaulding


Dear PSCAA...
Global Scientists Agree!
We Must Leave Remaining Fossil Fuels
In The Ground.
S.S. RENEWABLE
Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.
Name Charlie
Age 5

Dear PSCAA,

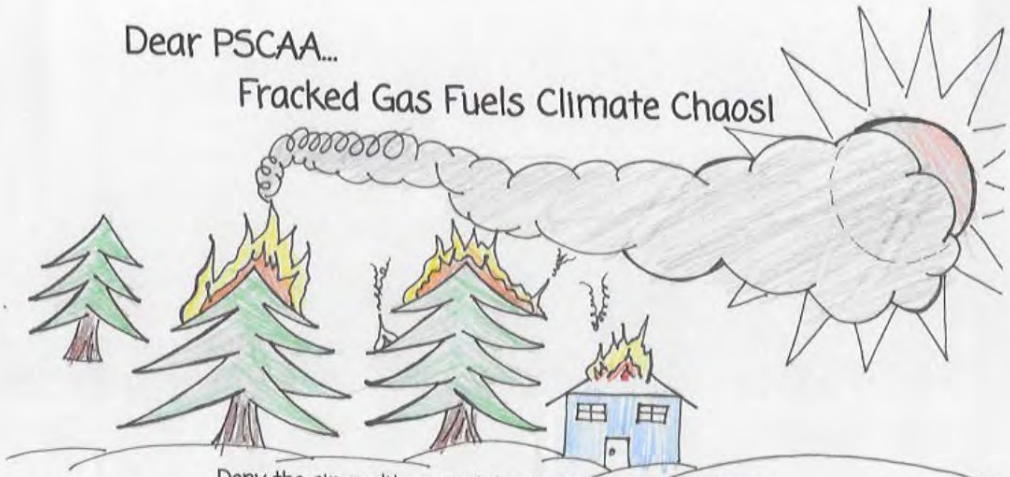
Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...



Name Charlie Age 5

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage, "natural" gas is potentially as bad for the climate as coal.

Name Margaret Spaulding Age 11

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...
so we can live.

Name Margaret Spaulding Age 11

Dear PSCAA,

Please Deny The Air Quality Permit
For The Proposed Tacoma LNG Project Because...



Name Alaina Sparling Age 13

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Alayna Spaulding Age 13

1484-1 22. General Opposition

From: George Feldman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:21:13 PM

Name: George Feldman
Email: feldmange@gmail.com
Address: 11230 SW Collina Ave. -
Portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please do not contribute further to our crisis in climate change by approving the Tacoma LNG Project. The Supplemental Environmental Impact Statement is in error as it uses outmoded assumptions of the dangers of methane. This project is a terrible idea, particularly coming after the recently-released report of the UN Climate Science group. Please do the responsible thing of turning down this project.
Thank you.
George Feldman, M.D.

1961-1 23. General Support

From: Magreta A Felt
To: Public Comment
Subject: I agree we need to stop using Bunker Fuel
Date: Monday, October 29, 2018 6:17:33 PM

Thank you,

Magreta Felt

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1290-1 10. LCA Calculations
1290-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1290-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Judy
To: Public Comment
Subject: Draft SEIS - LNG Facility comment
Date: Monday, November 19, 2018 10:29:09 PM

To: Puget Sound Clean Air Agency

I am a 30 year resident of Browns Point. While I was unable to attend your recent Citizen Forum, I have attended several other PSCAA Citizen meetings in NE Tacoma. I appreciate those meetings and regret that I was unable to attend the LNG 'public comment' opportunity.

As I continue to read and inform myself about the impact of the LNG facility in the Port, which is just a few miles from my home, I was disturbed to receive notification from the Dept. of Ecology regarding public input on a West Rock request for an increase in the use of natural gas at their Tideflats plant. I continue to have grave concerns that PSCAA is only measuring individual emissions at Port manufacturing sites and is not monitoring the cumulative effects of these emissions in Port air. As all proximate Port residents know, the Port occupies a small footprint, surrounded by residential communities on 3 of its 4 sides. It is not an isolated Port amidst only manufacturing plants. Furthermore, it is in area subject to weather inversions that can trap emissions for a period of days. The very poor air quality during these times is of health concern to area residents and Port employees who work outside. The Simon Metals Lithium battery fire on September 17, 2018 was a prime example of the harm that can be caused. I live just upslope from Caledonia Bay and across from the Asarco smelter site. When I woke that morning, I immediately smelled something inside my home and was concerned that I might have an electrical problem of some kind. While it was a relief to find it smelled much worse outside, the air that I inhaled almost immediately caused discomfort in my nose and throat. That fire took a number of hours to extinguish and many residents and outside Port workers were in harms way that day, with little to no public notice of what the situation was. While this was an unexpected incident, it does speak to the fact that on any given day, additional pollutants can be added to the Port's normal daily 'brew' and only an environmental scientist can advise how all the components react when mixed together.

Following are my concerns regarding the Draft SEIS for Puget LNG's LNG facility. The current version of the draft SEIS does not contain all the information needed to fully assess the accuracy of the analysis and the predicted impact of the LNG facility. There are at least 10 places in the study that have “placeholder” values instead of actual data. I request that PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period to provide feedback on more current and relevant data regarding the project.

I remain equally concerned regarding the use of 'reporting agencies' references to studies, models, etc. that are simply outdated or are under reported. The SEIS's 2007's values must not be those referenced, rather 2016 Global Warming Potential values must be those used in an LNG SEIS. The Bakken oil field fracking boom did not begin until 2008. A 2015 Brookings Institute study states that increased fracking operations outpaced data collection on the environmental impacts of fracking. The authors wrote "In conclusion, scientists remain concerned about a number of environmental damages caused by fracking. Unfortunately, data collection has not kept pace with the boom in extraction, and a great deal of uncertainty remains regarding pollution from fracking. This uncertainty has limited the ability of regulators to target those areas of greatest concern; it has also limited their ability to regulate in a cost-effective way. Higher quality comprehensive data on baseline levels of environmental quality as well as on emissions from individual producers would go a long way. In the absence of such data, regulatory options remain limited and are unlikely to be cost-effective." https://www.brookings.edu/wp-content/uploads/2015/03/2015a_hausman.pdf

Furthermore, based on proliferation of fracking in the last 10 years, a 100 year GWP is not sufficient. A 20 year GWP value must be used due to the urgency of the climate change that is now being experienced globally. From a 2016 Guardian article "Emissions of the powerful greenhouse gas methane have surged in the past decade, threatening to thwart global attempts to combat climate change. Scientists have been surprised by the surge, which began just over 10 years ago in 2007 and then was boosted even further in 2014 and 2015. Concentrations of methane in the atmosphere over those two

years alone rose by more than 20 parts per billion, bringing the total to 1,830ppb. https://www.theguardian.com/environment/2016/dec/12/rapid-rise-methane-emissions-10-years-surprises-scientists

Methane leak data must be reanalyzed in light of under or non-reporting. As the Port's now defunct Methane facility was being considered, there was an explosion at the Plymouth LNG facility in Eastern Washington. At the time, there was circular reasoning going on that the incident could not be categorized as an explosion of Methane, because it was coming to temperature from its frozen LNG state - - and vice versa. I would hope that this is indeed being reported as the Methane leak that it was and that this incident's data is reported in leak statistics. BC reporting fails to incorporate 2017 and 2018 analyses that show a large percentage of the fracked gas wells are under reporting their methane leakages.

What investigation has assured that all Puget LNG will actually come from British Columbia? While there is a claim that all of the natural gas will be coming to the plant from British Columbia, a recent natural gas pipeline explosion in BC used natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. Per PSE's 2017 10K filing with the Securities and Exchange Commission (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).

Other questionable data in the current Draft SEIS relates to Puget LNG's customers. At this time, there is a claim for greenhouse gas emissions reduction credits for maritime customers that Puget LNG does not currently have. This credit cannot be legitimately be claimed. Further, in respect to TOTE, PSE’s assumption on their methane slippage rate has been questioned by a reviewer, who indicated that they should be using the higher rate as that is considered best practice.

My final concern regards the inclusion of start-up, shut down and 'incident' emissions that I understand are not required to be reported by Port industries. I find this practice quite bizarre and a very big 'gimme' when it comes to airborne pollutants in the Port. A family member worked outside in the Port of Tacoma where he, and the warehoused cars that he handled, were often 'rained on' by an unexpected US Oil 'burp.' The spew was an oily, smelly 'rain' that had to be quickly removed from the new cars to avoid damage to the exteriors. Willa Subra, a Louisiana chemist and environmentalist, stated in her local public appearances regarding the proposed Methane facility that start-ups and shutdowns were often the most dangerous of times at a plant. How can any emission that a facility exudes not be measured and tabulated as real data? Start-ups and shutdowns are certainly routine, if not calendared, procedures for maintenance, inspection, etc. at commercial facilities. While 'yikes' incidences are just that, facilities still are aware that things might go wrong and formulate measures, plans and trainings to be as 'ready' as possible when that time arises. Allowing major industry to have 'passes' on any of their emissions and/or emissions procedures is wrong and irresponsible. Any emission that leaves their facility should be monitored and reported. I would urge you to require Puget LNG to reveal and include all information relating to emissions in the start-up, shutdown and 'worst case incident' phases.

Thank you for your consideration of my thoughts and concerns regarding the Puget LNG facility and its emissions. I am not a NIMBY regarding the LNG facility. I don't believe that it should be built in anyone's backyard at this stage of the game, as I believe that Puget LNG has been duplicitous in much of its reporting and paid advertisements.

I have numerous additional concerns regarding the LNG site include taxpayer and ratepayer subsidization, safety issues, and the legality of the exclusion of the Puyallup Tribe in this process. I'll be addressing these concerns, if necessary, with the appropriate agencies down the road.

Thank you.

Judy Ferguson
7219 East Side Dr NE
Tacoma, WA 98422
(253) 927-2179

1290-3 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1290-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1290-5 13. LCA Inputs and Assumptions - Natural Gas Source
1290-6 19. LCA Inputs and Assumptions - End Use
1290-7 20. LCA Inputs and Assumptions - Facility Downtime

1741-1 10. LCA Calculations

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 10:39:18 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project

Sincerely,

Judy Ferguson
medfordgrad@aol.com
98422

1615-1 22. General Opposition

From: P.C. Fergusson
To: Public Comment
Subject: Please stop fracking the planet
Date: Sunday, November 18, 2018 9:12:29 AM

We live here. So do all the other animals and plants. You are destroying our habitat and bringing down doom on us all. For what? More money? Don't you have enough freaking useless stuff? We don't want your dirty oil. Please, please, please find a way to create sustainable and renewable energy. Please stop fracking the planet.

There are a lot of scientific reasons you should not move forward with fracking. I'm sure you are reading about them in other emails and letters. There is also a central, irrefutable moral reason. It's wrong. You know it. Listen to your heart and soul. Please stop.

Patsy Fergusson
pcferg@gmail.com

940 Union St. #6
San Francisco, CA 94133

1825-1 22. General Opposition

From: Evelyn Fielding Lopez
To: Public Comment
Subject: Tacoma LNG Facility
Date: Wednesday, November 21, 2018 1:21:28 PM

I am opposed to building the proposed LNG Facility in Tacoma, or anywhere in the Puget Sound. The great challenge of our lives is addressing climate change. Any increase in emissions in our area is a step backwards in that fight.

There is no need for LNG. PSE claims that the fuel will be used to meet high demand for natural gas, but it would be preferable for customers to reduce their usage or identify alternative, cleaner fuel options (e.g., solar). Every home using natural gas for heat also has electricity, and electric heating may be used as a supplement should any shortage of gas occur. I have lived in Washington for 30 years, and in California before that (with gas heating) and have never heard of a gas shortage affecting the availability of home heating gas.

TOTE Marine is also identified as a potential user of LNG, but there are better options for marine fuels as well. The Washington State Ferries are moving to electric power as a cleaner alternative to current fuels. That means that electric power for large ships will be available in our area, and there will be local expertise for installing and maintaining equipment.

Given recent reports about the imminent impacts of warming and climate change, it would be irresponsible to approve any increase in emissions in the Puget Sound region unless there is a compelling need. There is no compelling need for LNG

I urge you to deny the air quality permit.

Evelyn Fielding Lopez
2208 N. Bristol Street, Tacoma, WA 98406
email: evelynflopez@gmail.com
phone: 253-229-2362

1688-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 14, 2018 12:52:14 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Do NOT allow a liquid "natural" (FRACKED) gas facility to be built on the Puyallup people's land. This is their land and they oppose it. All thinking people, who understand the affects of such a facility on the health and well-being of all people, oppose it.

Sincerely,

marjorie Fields
mvfields@me.com
98020

1770-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:29:31 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I am very concerned about the impacts on human health if Puget Sound Energy's proposed liquid "natural" (fracked) gas facility is allowed. Our environment cannot accommodate more of this pollution.

Sincerely,

marjorie Fields
mvfields@me.com
98020

1958-1 23. General Support

From: Bruce Finnie
To: Public Comment
Subject: Comments on Tacoma LNG Proposal
Date: Tuesday, November 20, 2018 6:15:32 AM

Comments on Tacoma LNG Proposal:

I am a resource economist and environmental risk analyst. Since 1975 I have worked on dozens of assessments similar in scope to the proposed Tacoma LNG facility.

Simply stated, all developments have impacts – some positive some negative. Most importantly, it has been my experience that when decisions are made in the absence of quantitative evidence, that most such decisions are poor ones. Emotion should never be allowed to trump reasoned judgment.

In risk analysis natural trade-offs exist between contraindications and indications. Perhaps you might consider the health benefits of LNG in the maritime industry, and Asian trucking as well as other experimental attempts to reduce the negative environmental/health side-effects of conventional fuels. A quick look at real time air quality data (https://waqi.info/) will shed some light on where LNG demand is likely to be greatest.

Focusing on shipping related heavy bunker fuel only, conversion to LNG delivers:

- 100% reduction in SOx emissions
- 85-90% reduction in NOx emissions
- 15-20% reduction in CO2 emissions

CO_2 emissions from shipping are double those of aviation and increasing at an alarming rate which will have a serious impact on global warming.

Ironically, aviation related carbon dioxide emissions, estimated to be about 2% of the global total, have been at the forefront of the climate change debate because of the sharp increase in cheap flights; whereas shipping emissions have risen nearly as fast over the past 20 years but have been largely ignored.

Separate studies suggest that maritime carbon dioxide emissions are not only higher than previously thought, but could rise by as much as 75% in the next 15 to 20 years if world trade continues to grow and no action is taken. The figures from BP, which owns 50 tankers, and researchers at the Institute for Physics and Atmosphere in Wessling, Germany reveal that annual emissions from shipping range between 600 and 800m tonnes of carbon dioxide, or up to 5% of the global total or more than all African countries combined.

Unfortunately, CO_2 emissions from ships do not come under the Kyoto agreement or any proposed legislation and few studies have been made of them, even though they are set to increase.

An IMO study of greenhouse gas emissions has estimated that emissions from the global fleet would increase dramatically in the next 20 years as globalization leads to increased demand for bigger, faster ships. Without action the IMO predicts that by 2020, emissions from ships would increase up to 72%.

While shipping has maintained a clean image largely because water-based transport uses a fraction of the energy (per ton mile) as other carriers, significant environmental improvements can be made with cleaner burning LNG.

Admittedly real-world decisions are never perfect – involving health and environmental, as well as moral trade-offs particularly spatial ones. Preventing potential health risks in one area (Tacoma) should not be allowed to supersede the probable and much larger health benefits in many other areas.

We are part of a global community and these world-wide trade-offs should be considered suggesting that some serious science-based cost-benefit analysis would be in order.

Best Regards,

Bruce

Dr. Bruce Finnie, *Emeritus* School of Business

& Consulting Economist/Environmental Risk Analyst

Virus-free. www.avast.com

1339-1 22. General Opposition

From: Inga Fisher Willliams
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, November 18, 2018 6:37:23 PM

Name: Inga Fisher Willliams
Email: ingafw@gmail.com
Address: 2824 Northeast Cesar E Chavez Boulevard -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Thank you for the opportunity to comment on the proposed Puget Sound Energy LNG facility.

The claim that this fracked gast facility (LNG) will produce LESS pollution if built than if NOT build is laughable. Best check the proponents' claim in great detail.
Your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. The scientists who study GHG loading and its impact make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

The location of this LNG plant on tribal land ought to give them a veto right, in my opinion. Haven't we done enough damage?

Please, be prudent diligent and thoughtful in your review. I hope that you will take best available science into consideration when revising this draft SEIS.
Sincerely,
Inga Fisher Williams

1876-1 14. LCA Inputs and Assumptions - Leakage/Slippage

AT [redacted] Comment on DSEIS, PSE LN[redacted]

Dear Puget Sound Clean Air Agency,

I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

METHANE IS A POTENT GHG PRODUCING FUEL. LONG LASTING ALSO

THE CLAIM RE BC FRACKED GAS ACTUALLY REDUCES GHG IS [redacted]

& MUST BE QUANTIFIED. LEAKAGE & UP-STREAM FUGITIVE

EMISSIONS MUST BE INCLUDED IN THE SEIS.

A 'REDO' IS IN ORDER (Check here to continue comments on the other side.) ☐ ⇨

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the project must be done.

Name: INGA FISHER WILLIAMS Email: ingafw@gmail.com

Address: 2824 NE CESAR CHAVEZ BLVD, PORTLAND, OR 97212

By signing this comment card you agree to receive updates about the project.

Lynn: My name is Lynn Fitz Hugh. I was called a minute ago, when I was out of the room. So, is it all right for me to go ahead?

Steve: What's your name?

Lynn: Lynn Fitz Hugh.

Steve: Go ahead.

Lynn: Okay. My name is Lynn Fitz Hugh. I'm the coordinator of the Faith Action Climate Team. Most children in this country have been taught two histories of the relationship of the US to Native Americans.

[03:56:07] They've been taught the truth, or they've been taught a prettified version. I was taught the version in which US military slaughtered Native women and children, where they were forcibly removed from their lands, where they were put onto reservations, where treaty rights were violated over and over and over again, where people were deliberately exposed to fatal diseases, where children were taken from their parents and put into boarding schools, and where deliberate cultural genocide took place. I have wanted to believe that that is a history that we've put behind us.

But over and over again, I see that it is still the history of colonization that's being carried out today. This LNG proposal is another example of it.

[03:57:00] It violates their treaty rights, in that there was no meaningful consultation. It perpetuates doing things to their land that they very clearly stated that they don't want to have happen. And as one Native person said to me, if it blows, the pollution will pollute all of Puget Sound. I'm not the only person in this room who finds this outrageous and unacceptable. Could I see a show of hands of everyone who finds these treaty violations unacceptable? So, let the record show that that's about 80% of the people. And regardless of what's decided, we will act on our outrage. Thank you.

1710-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 2:27:48 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Vanessa Flanagan
s.vanessa59@yahoo.com
98444

1978-1 23. General Support

From: Craig Forbes
To: Public Comment
Cc: tim@thompsoncg.com
Subject: Port of Tacoma LNG Facility
Date: Thursday, October 25, 2018 11:31:09 AM

As a resident of Western Washington, this project is important to me personally and my company for several reasons. American Fast Freight is a transportation provider moving food, retail, and assorted goods to the residents and businesses of Alaska. AFF's ability to service our customers relies on the Tote vessels sailing from Tacoma. We have many employees that live in Pierce and King counties.

The environmental benefits resulting from converting the Tote vessels to LNG are clear. Cleaner air and cleaner water are critically important to all of us living in and around Puget Sound. As concerns about climate change grow, this effort to reduce greenhouse gasses needs to be supported. Forcing Tote to continue to burn diesel fuel is less environmentally friendly, and fails to capitalize on technology improvements available.

It's important that the Port of Tacoma remain competitive with other ports around the world that are building LNG facilities by moving forward with this project. LNG is much cleaner burning fuel and is the best current option for reducing greenhouse gasses and reducing air and water pollution.

I'm disappointed by the delay to this project caused by the environmental review taking so long. As a fisherman, hiker, and outdoorsman that spends a lot of time outside in Washington, it's important to me to move forward quickly when there are opportunities available to improve air and water quality. Please move forward quickly with the necessary approvals to get this done.

Regards,

Craig Forbes | Vice President, Alaska Operations | **American Fast Freight**
7400 45th St Ct E~Fife, WA 98424 | **(O)** 253.926.5017 | **(M)** 253.722.4510 AmericanFast.com

AFF Global Logistics: American Fast Freight | Caribbean Shipping Services | Global Transportation Services |Grand Worldwide Logistics | Hawaiian Ocean Transport

1864-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

1. THIS PROJECT DOESN'T HONOR TRIBAL RIGHTS & TREATIES.
2. IT'S TIME FOR ALL STATES TO GET OFF FOSSIL FUELS

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: BARBARA FORD Email: barbara.e.ford@gmail.com

Address: 7106 SE HARRISON CT, PORTLAND OR 97215

By completing this comment card you agree to receive updates about the project.

2186-1 22. General Opposition

From: tishaford@everyactioncustom.com on behalf of Tisha Ford
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 3:03:07 PM

Dear Responsible Official,

We need to STOP destroying our planet for short term gain.

Sincerely,
Tisha Ford
Santa Barbara, CA 93108
tishaford@gmail.com

0440-5 22. General Opposition
0440-5 3. Outside of SEIS Scope
0440-5 14. LCA Inputs and Assumptions - Leakage/Slippage
0440-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
0440-5 5. Regulatory Framework

Clean Air Agency Oct 30th Meeting

1. Dr. Linda Fortune, Tacoma resident since 1968
2. Thank you for giving us
   - This opportunity to share our concerns
   - And for taking a deeper look into the ramifications of the proposed LNG plant

     Its actual impact on our environment

     The scope of serious safety issues for people, animals and water sources

     The lack of truthfulness that has thus far contained in PSE disclosures

3. Personally, after exploring these issues, I have come to the awareness that
   - We have been sold a bill of goods since the early 1970's

     Apparently natural gas, methane, is only clearner at the moment of combustion

     In the long haul it is 80 x worse then coal and oil's environmental impact

     Methane directly raises the global temperature

     Besides, 70% of methane comes from the unclean process of fracking which has serious consequences for human and animal health and water is contaminated...whether in Canada or America

4. Serious safety concerns
   - For people and our environment
   - Inadequate pipe line maintenance was acknowledged as the cause of the explosion in Seattle's Greenwood neighborhood which resulted in a severe fine for PSE
   - LNG located on land fill, in the predicted future flood area of the Port, and on tribal fishing areas

5. Thank you
   - We need the foresight which you are making available
   - We need our community decisions based on truth, knowledge and facts.
   - We need agencies not to be 'glittered by the promise of money and jobs' at the expense to our people and our beautiful Northwest
   - We need you to make the hard, informed calls based on the truth

Dr. Linda Fortune

2246-1 10. LCA Calculations
2246-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2246-3 15. LCA Inputs and Assumptions - Natural Gas Properties
2246-4 13. LCA Inputs and Assumptions - Natural Gas Source
2246-5 11. LCA Inputs and Assumptions - General

From: Linda Fortune
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 5:24:45 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

Now, I am strongly asking you to muster the courage and act with integrity and deep concern for protecting our air quality in Tacoma. We have been sold a bill of goods as to the cleanliness of natural gas and you are the probably the only ones who can correct the damaging decisions that have been made thus far.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Thank you,
Dr. Linda Fortune

Linda Fortune
lafort3@wamail.net
4114 N 30th St

TAcoma, Washington 98407

1580-1 22. General Opposition

From: Michelle Fox
To: Public Comment
Subject: LNG in Tacoma
Date: Wednesday, November 21, 2018 2:51:09 PM

Please, do not move forward with this project. An accurate, throughout, unbiased environmental review has yet to be completely.

Thank you,

-Michelle Fox

1329-1 3. Outside of SEIS Scope
1329-2 22. General Opposition

From: linda reflexologyforbetterhealth.com
To: Public Comment
Subject: an aspect of LNG I"m not hearing about
Date: Thursday, November 1, 2018 8:19:03 AM

To all whom this concerns,

Can someone explain to me why natural gas is being called "clean" when the method(s) to extract it have been shown to be harmful to people and to the environment. I'm not hearing that this has been part of the LNG discussion, and it very much needs to be.

For example:

- fracking has caused hundreds of earthquakes in Oklahoma where fracking is rife and earthquakes were apparently non-existent or quite rare prior to fracking activity.
-
- tap water in areas of high fracking were shown (e.g. in the film *Gasland*) as easily set aflame, yet we cannot know the chemicals in fracking compounds because they are kept secret.
-
- The Trump Administration has expressed interest in extracting oil and gas in Western states. The film *Dear President Obama* narrated by Mark Rufulo shows fracking rigs alongside children's playgrounds and elsewhere strewn about ordinary neighborhoods. This is a nightmare I do not want to see replicated in our beautiful Puget Sound region. Would you permit fracking here? It seems an LNG plant could be cited by an unreasonable Administration as additional reason to do so.

I urge PSE and the City of Tacoma to include reviews and evaluations of extraction methods as part of your decision-making process and as part of the community discussion about natural gas:

Sincerely, Linda Frank
9124 Portland Avenue E., Tacoma, WA 98445
253 576-9541

Steve: Next up, Molly Frankel.

Molly: I stand before you tonight wearing the robe made for my father, Jacob Porter Frankel, who, as one of the scientists that started the Lawrence Livermore Lab in California, nuclear development facility, and was a scientist with the University of California Los Angeles, began a curriculum, the first in the world, to look at humanizing the technocracy. And he started working on this in the late '50s/early '60s. So, in honor of him, among others, I'm wearing his robe. I am a journalist.

[05:27:00] I have a master's in journalism. And one of the things journalists do is they look at documents. And this isn't your document, although you commissioned it. This is the document prepared by the Ecology and Environment Incorporated. And they start out with a SEPA fact sheet. And SEPA is the State Environmental Protection Association. And by calling it a fact sheet, they give it extra weight. And the fact sheet says that the proposed action is to construct and operate an LNG blah, blah, blah. But what we're talking about is a facility that's almost totally completed.

So, what we're, generally, talking about is will you guys approve actually getting it going. And the way the SEPA fact sheet expresses this is in terms of two alternatives.

[05:28:00] The no action alternative and the proposed action. As human beings, when we hear no action alternative or proposed action, proposed action is up here and no action is way down here. That's just the way humans hear things, in terms of linguistics. Let's look and see just two sentences how they describe the no action alternative. The no action alternative is construction of the Tacoma LNG facility, including upgrading of the natural gas distribution system would not occur. Existing levels of maritime petroleum fuels use would continue. Unfortunately, what they're doing is conflating two things.

It is possible for you guys to create an order of non-approval of this environmental impact draft. And what that would mean is that we wouldn't continue to construct the facility, and we wouldn't operate it.

[05:29:02] But that doesn't mean, ipso facto, that we would be using existing levels of maritime petroleum fuels. It's very interesting to me that this document lists 15 agencies as having responsibility at different stages of the process. The last three agencies listed are the

Puyallup Tribe of Indians, the Muckleshoot Tribe, and the Puget Sound Clean Air Agency. The Puyallup Tribe and the Muckleshoot Tribe have the responsibility for Section 106 Consultation. What is Section 106 Consultation? We see that it's National Historic Preservation Act. So, we're asking the –

Steve: Can I ask you to get close to wrapping up, so we can get to other commenters?

Molly: Yeah. What I want to say is we're looking to the tribes to look at the natural historical preservation, instead of looking at them as living government that has concerns for today and the future.

[05:30:00] And I think, instead, we should look at the maritime industry for historical and look what they did with the whales.

1467-1 22. General Opposition

From: kari franzen
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 10:44:19 PM

Name: kari franzen
Email: franzen.kari@gmail.com
Address: 35 crestfield court -
lake oswego, Oregon 97035

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

do not trust a company that has already begun to build a facility that has not been permitted and supplies such a flawed report to ram it through. the site is not their land and they haven't considered or consulted with the first nations people WHOSE LAND IT IS. i completely oppose any building of these facilities for a future facing climate chaos and that flies in the face of science, logic and every breathing being for the greed of peak oil profiteers that are base in every way. the whole process from beginning to end is corrupt and dirty and the earth is not theirs to pillage for a future for generations to come oand that PSE doesn't deserve. PSE deserves to lose any investment they have put into the project, any taxpayer or customer subsidizing ever, and should be divesting from fossil fuels and investing in a future of solar if it wants to be in any kind of business. PSE should be denied any further access to the site and backed up with the national guard if necessary.
NO LNG, NO FOSSIL FUEL infrastructure, NO MORE INVESTMENT IN THE DEATH OF THE FUTURE: NO TO PSE, NO TO ANY OTHER THAT TRIES TO RUN ROUGHSHOD OVER THE EARTH!!!

1478-1 22. General Opposition

From: Wendy Friedman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:43:54 PM

Name: Wendy Friedman
Email: wendyanna56@gmail.com
Address: 260 Sunnyside Drive -
Eugene, Oregon 97404

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

I am a citizen of Oregon, with family and friends in Washington State. I am writing to share my strong opinion that the draft SEIS does NOT account for the full climate impact of global warming. Additionally, I stand with the Puyallup Tribe in OPPOSITION to the LNG facility.

Sincerely,
Wendy Friedman

1534-1 10. LCA Calculations
1534-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Dorothy Frisch
To: Public Comment
Subject: Clean Air Needed!
Date: Saturday, November 17, 2018 7:18:57 PM

To whom it may concern:

I ask you to have the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period. There are a number of places in the SEIS that are missing data. How can a good decision be made without this data?

In addition, I ask you to rectify the questionable assumptions about methane leakage. More realistic estimates of methane leakage from British Columbia and from TOTE maritime vessels would change the discussion of how viable this Puget Sound Energy Liquefied Natural Gas project is, in terms of protecting the environment, including Puget Sound.

Thank you.

Dorothy VanAndel Frisch

1662-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1662-2 10. LCA Calculations

From: Dorothy Frisch
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Friday, November 9, 2018 8:06:27 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I ask you to complete the SEIS. It is missing crucial data; a well-informed decision cannot be made without this data. Furthermore, some of the assumptions need close examination, such as the assumption that leakage rates will be reasonable. This assumption seems to based on self-reported data from the industry itself.

I thank you for the review process you have started and ask you to use the best possible science to complete the SEIS.

Dorothy Frisch
dfrisch@charter.net
2500 Breton Woods Dr. SE #4021
Grand Rapids, Michigan 49512

1901-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

DEIS is using outdated methane global warming potential value. They did not use the best available science for the Global Warming Potential (GWP) value for methane.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Eileen Fromer Email: efromer@msn.com
Address: 8175 SW 71st Ave Portland OR 97223

By completing this comment card you agree to receive updates about the project.

2250-1 10. LCA Calculations
2250-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2250-3 10. LCA Calculations
2250-4 13. LCA Inputs and Assumptions - Natural Gas Source
2250-5 11. LCA Inputs and Assumptions - General

From: Christopher Fuentes
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 3:09:07 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Puget Sound resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Christopher Fuentes
chris.e.fuentes@gmail.com
4633 S. 150th St.
Tukwila, Washington 98188

1475-1 22. General Opposition

From: Lyle Funderburk
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:09 PM

Name: Lyle Funderburk
Email: lyle.funderburk@gmail.com
Address: 10003 SE Foster -
Portland, Oregon 97266

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

LNG facility in Tacoma must not be built. Shift from fossil fuels to wind and solar are needed.

1335-2 22. General Opposition
1335-2 5. Regulatory Framework

From: Beth Funsch
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, November 19, 2018 9:50:34 AM

Name: Beth Funsch
Email: bethfunsch@gmail.com
Address: 1028 SE 78th Avenue -
Portland, Oregon 97215

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Thank you for the opportunity to comment on this project in Tacoma. This project should not move forward at it is slated to be built on tribal lands and does not have their consent.
Plus the environmental impact would harm wildlife and conservation efforts. The orca populations are at risk as well.

Thanks again
Beth Funsch

2567-1 3. Outside of SEIS Scope
2567-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2567-3 13. LCA Inputs and Assumptions - Natural Gas Source
2567-4 7. SEPA Alternatives

From: deirdre@everyactioncustom.com on behalf of Deirdre Gabbay
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Wednesday, November 14, 2018 10:32:28 AM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project.

I oppose this project and urge you to stop construction for the following reasons:

1. The Puyallup people oppose it and it is adjacent to their lands. They hold the sacred trust of protecting their lands, and the species that depend on them, for themselves and for future generations.

2. This facility will hold fracked gas. Fracked gas damages the earth when it is extracted, damages ground water, and leaks methane which is a potent greenhouse gas. Fracked gas is not a necessary bridge fuel. We should immediately transition to renewable energy. The gas, once burned, will pollute our atmosphere for centuries. We need to immediately cease construction of new fossil fuel infrastructure.

3. This facility is a time bomb. Should an earthquake, a tsunami, or volcanic eruption occur, it will explode into a huge blast zone causing environmental devastation. These events are endemic to our area. They are easily foreseeable. Be prudent and avoid tragedy.

Thank you for considering these comments.

Sincerely,

Deirdre Gabbay

Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are

also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Mrs. Deirdre Gabbay
120 W Smith St Seattle, WA 98119-2319

2567-4 cont'd 7. SEPA Alternatives
2567-5 1. Determination of SEIS Scope - Comparison to FEIS
2567-6 10. LCA Calculations
2567-7 22. General Opposition

1719-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 1:34:02 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracking poisons groundwater which is vastly more important to life than gas. That groundwater may be the difference between life and death for humans or wildlife one day in the future. We have no right to permanently contaminate this precious resource. We need clean renewable energy right now.

Sincerely,

Deirdre Gabbay
deirdre@gabbay.org
98119

1637-1 22. General Opposition
1637-2 5. Regulatory Framework

Mahoney, Melisa

From: stagefrog2@gmail.com
Sent: Saturday, November 10, 2018 12:26 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear Puget Sound Clean Air Agency,

Thank you for taking the time to listen to public comments on the draft SEIS on the PSE LNG Project. I arrived to make comment in person on Oct. 30 and was informed that over 100 people had already signed up for comment, so I decided to write instead. I stayed for 2.5 hours and heard 53 people: 43 opposed to a permit for the project and the DSEIS as written, 9 in favor of it, and 1 speaker who did not seem to have a clear position. In other words, there were almost five times as many people opposed to the project as in favor of it. Those opposed came from a broad range of life experiences, from medical professionals to Puyallup tribal members, from elder Christian women to young genderqueer people, from scientists to teachers, from port workers to musicians. I hope you will consider sheer numbers in your decision, and redo the draft SEIS and deny any permits for PSE's LNG Project.

We are living in unprecedented times. As I write this comment, the most destructive fire in California history is incinerating homes, life, and land, bringing to mind the heavy smoke we had this summer that reached "unhealthy for everyone" levels here in Washington State. Islands are disappearing under rising oceans, desertification and sea level rise is causing once fertile farmland to become barren, rising global temperatures are causing more extreme weather events, and species are going extinct at unprecedented rates. Human- and fossil-fuel-caused climate chaos is not a future possibility but has arrived now. This loss of life is guaranteed to increase unless we all come together to drastically change our way of life in a very short timeframe. There is absolutely no future for humanity unless we immediately stop all new fossil fuel production. (See the most recent U.N. Intergovernmental Panel on Climate Change report for more details.)

I am writing to you as a former union construction worker who requests a redo of the draft SEIS and denial of any permits to PSE's LNG Project. I believe in economic justice for my fellow workers and I also believe in a livable planet for us. It is a false choice between jobs and the environment—having a job when there's no clean air to breathe is irrelevant. We should be putting our tax dollars and collective intelligence towards a just transition to a new economy, one that is not based on the exploitation of fossil fuels or people. Furthermore, I am confused by the argument that fracked gas (LNG) is a "transition" fuel alongside the argument to use 100-year GWP values in the draft SEIS. If it's a transition fuel, then the draft SEIS should consider the 20-year GWP values. According to the recent U.N. Intergovernmental Panel on Climate Change report, we don't have 100 years to transition out of fossil fuels. We don't even have 20 years. Rather, we have 12 years to cut carbon emissions by 45%. In that case, it makes no sense to invest in any new fossil fuel infrastructure.

I am also writing to you as a non-indigenous person living on the stolen land we now call Washington State. I support the Puyallup Nation's knowledge and comments rejecting a fracked gas facility on their traditional land. Native people have thousands of years experience in maintaining sustainable practices specific to their area. It is only in the last 150 years of colonization that we settlers have managed to damage these ecosystems so badly. While we cannot control what our ancestors did in the past, we can take collective responsibility for the future by respective Puyallup's rights as a sovereign nation and by redoing the draft SEIS and denying any permits for PSE's LNG Project.

Finally, I write to you as a current youth counselor in a rural community mental health agency. The youth I see are understandably struggling with anxiety and depression, as they are terrified about the future. They love the trees and water and air where they live, and they are discouraged to see older generations continue to make decisions that lead to climate chaos. I would love to be able to tell them that there are adults at the Puget Sound Clean Air Agency who are taking a bold stand for a sustainable future.

It is time for each of us to notice what role we can play and decide to take decisive action. Those of you in charge of the draft SEIS and permitting for the PSE LNG project are in a wonderful position to play a courageous and protective role in history. There are so many amazing examples of people in decision-making positions taking a stand for a better future. For example, Chiune Sugihara (the Japanese man who ran the consulate in Lithuania during WWII) saved over 6,000 Jews from death camps by issuing visas for them against the orders of his supervisors. In comparison, you have the opportunity to save tens of thousands people from a deadly explosion in the short term and billions of people from climate chaos in the long run. And you would not even have to defy the law—current laws and science clearly give you the power to redo the draft SEIS and ultimately deny the permit to the PSE LNG Project. I hope you will take this opportunity to be your best selves and stand for the future by redoing the draft SEIS and denying all permits for new fossil fuel infrastructure.

Sincerely,
Julianne Gale
stagefrog2@gmail.com
Hoodsport, WA

1854-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1854-2 13. LCA Inputs and Assumptions - Natural Gas Source
1854-3 19. LCA Inputs and Assumptions - End Use

From: Maradel Gale
To: Public Comment
Subject: Public Comment Submission: PSE"s Liquified Natural Gas Project in Tacoma
Date: Friday, October 19, 2018 3:41:29 PM

Puget Sound Clean Air Agency:

As I will not be able to attend the October 30 hearing on the permits for the PSE LNG plant in Tacoma, please accept my written comments and enter them into the official record on this matter.

First and foremost, it is critical to use best available science when making such important decision regarding public and environmental health. For example, if the correct value for methane is used, it is clear that the LNG plant is actually dirtier than heavy fuel oil in terms of greenhouse gas emissions. That fact alone should end this discussion and rule out any permits for this installation based on clean air considerations.

We now know with certainty that we are facing grave and imminent challenges to reduce emissions that contribute to global warming. Therefore, the use of 100-year global warming potential values is flawed. We need to be looking at a much closer horizon, and the 20-year numbers are critical here. These numbers tell us that the LNG plant is much dirtier than what has been projected and will contribute dangerously to greenhouse gas emissions.

It's pretty obvious (see the campaign against I-1631) that we can't expect honesty from the fossil fuel industry, so extra diligence is required in analyzing data provided by them. For example, current fracked gas wells are under-reporting methane leakages, making the DSEIS figures suspect in this area. And the source of the fracked gas cannot be guaranteed to come from any particular plant, such as the one in British Columbia. These fossil fuel pipelines are all interconnected, and when one must shut down, another valve is opened to continue the flow of gas. So any reassurance that we are going to be using only BC fracked gas is a chimera.

Finally, pretending that there are additional maritime customers for this gas

which enables credits to be given for greenhouse gas reductions is another falsehood as there are no such customers, and thus the DSEIS should not give credence to this claim.

In this day and age when we are fighting for the survival of not only many aspects of our local environment, such as Puget Sound and the fauna that live there, but for the continued existence of the human race, it is ludicrous to consider granting permits for a LNG plant such as proposed by Puget Sound Energy. This company already contributes greatly to greenhouse gas emissions through its dirty coal plant in Montana. They should not be given permits to exacerbate the problems of climate change even more.

Sincerely,

Maradel K. Gale
239 Parfitt Way SW, #2A
Bainbridge Island, WA 98110

RECEIVED
NOV 7 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740

→ 2405 No. Stevens St Tacoma WA 98406

0675-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0675-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0675-3 21. LCA Inputs and Assumptions - Additional Air Pollutants
0675-4 3. Outside of SEIS Scope
0675-5 10. LCA Calculations

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
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   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA — Ron Morrison

Billie Blattler , Steilacoom WA — Billie Blattler

Carole Galloway, Tacoma WA — Carole Galloway
Puyallup Tribe Mbr #740

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
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Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Puyallup Tribe Elder #740

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Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740



Ms. Carole Galloway
5216 64th St W
University Pl, WA 98467-3702

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2094-1 3. Outside of SEIS Scope

Fracking requires more money + energy than it produces. This is a ponzi scheme that puts our taxes, retirement funds, and future economic sustainability at great risk. We must not sacrifice the lives of our children and grandchildren in these certain to fail projects

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kathleen Galvin	Email: Kathleen g7@comcast.net
Address:	Phone: 425-443-4357

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2095-1 3. Outside of SEIS Scope

I love all the convenience of our modern technology of fossil fuels - I know my children and their children will need to adapt to a world without fossil fuels and the technological pleasures we have - ~~Only~~ I keep thinking - will future generations hate us for our refusal to change even a little - lets invest in alternative energies -

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kathleen Galvin	Email: Kathleen.g7@comcast.net
Address:	Phone: 425-443-4337

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2096-1 3. Outside of SEIS Scope

Please look at how much water will be wasted. look at the challenge of associated with the disposal of the contaminated water. For every liter of gas - we have used several liters of water.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kathleen Galvin	Email: Kathleen.g7@comcast.net
Address:	Phone: 425-443-4357

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2097-1 3. Outside of SEIS Scope

We are using the earth's resources at an unsustainable pace. When I look at the amount of plastic we use everyday - the amount of garbage we generate I have a pain in my gut - This can't go on much longer - We must stop using fossil fuels - We must change direction. I really fear for the generations to come.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kathleen Galvin	Email: Kathleen.g7@comcast.net
Address:	Phone: 425-443-4357

1845-1 22. General Opposition

From: Michael Garrity
To: Public Comment
Cc: ryan.mello@cityoftacoma.org; Melissa Malott
Subject: Tacoma LNG
Date: Tuesday, October 30, 2018 8:10:37 PM

Dear PSCAA,

I am writing this brief comment to encourage you to redo your analysis of the climate impacts of Puget Sound Energy's Tacoma LNG facility. As Citizens for a Healthy Bay has noted, your analysis fails to look at the impacts of methane releases on a timeline relevant to the shorter-lived, more potent heat trapping effects of methane relative to carbon dioxide. Please address this analytical shortcoming in your final SEIS.

Also, please keep in mind that this project has been gamed by PSE to create pressure on regulators like yourselves to permit the project. As you know, construction has proceeded in the absence of full permitting (such as that from PSCAA) and opposition from the Puyallup Tribe and much of the rest of the local community.

While it is not your job to weigh in on all aspects of the LNG facility, it seems fair that you apply maximum scrutiny to a dangerous, poorly sited project that has been pushed on the community with a cynical blend of disrespect, deceptive claims, and a shoddy public process.

Thank you for your consideration.

Sincerely,
Michael Garrity
608 N Sheridan Ave
Tacoma, WA 98403
mdgarrity@gmail.com
206-852-5583

Sent from my phone

1418-1 22. General Opposition

From: andrew genung
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 1:30:15 PM

Name: andrew genung
Email: andrewbgourley@gmail.com
Address: 228 n jessup -
portland, Oregon 97217

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

I greatly appreciate all who are involved in contesting the studies, that in my opinion are clearly designed to construe the facts and reality of the impact of the proposed LNG refinery. The long-term forecasting of the greenhouse gasses produced by this project obviously show different levels than the short-term. The SEIS is blatantly using whichever studies they pick and choose from to make the argument they want. Again, thank you for fighting the good fight against the corrupt manipulation of data for the profit of the already rich and powerful.
If I have any real input on how wrong this project is, it is that it is being built on Puyallup tribal land. The Native American community as a whole has suffered genocide and virtual genocide since the introduction of white settlers. The Native Americans have been reduced to small land ownership. The little land the many tribes do still “control” is being stolen by projects like this.
The Puyallup people do not want this on their land. They are not consenting. No means no!

Sincerely, Andrew Genung

1910-1 22. General Opposition



Photo by Chris Schwarz (CC BY-ND 2.0)

11-08-18
Susan Gere 9311 N Willamette Blvd Portland OR 97203

09 NOV 2018 PM 3 L

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

DEAR P.S. Clean Air Agency:
I stand with the Pullayup in opposing the LNG facility.
Fossil fuels are on the way OUT, becoming more expensive in $ & as well as planetary deadly emissions.
And somehow the native communities always get the worst effects.
But it's coming for all of us - pipeline leaks, then weather disruptions, then ecosystem collapse.

This is down to a decade we can fix the structure of energy use! IPCC doesn't make it a, want to take the risk? ACT! DENY!

sincerely, Susan Gere

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS, PSE LNG Project
1904 3rd Ave.
suite 105
Seattle, WA 98101

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0610-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,
Please study the chemicals involved in fracking. You cannot accurately reflect the impacts of this project without knowing all the chemicals involved

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Ceeile Gemes	Email:
Address: 6057 6th Ave NE, Seattle, WA	Phone:

0611-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,
we need to get off fossil fuels NOW. please do not Compair this project to other fossil fuels. Please Study the impacts of this project do not Waste our tax money Studying other hypothetical projects.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Cecile Cerner	Email:
Address: 6057 B th Ave NE Seattle, WA.	Phone:

0612-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,
Please study the impacts of Man Camps for building pipelines, fracking, and building of these projects on Indigenous women, and all other women.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Cecile Gerner	Email:
Address: 6057 60th AVE NE Seattle Wa 98115	Phone:

0613-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,
I Love Jobs, please study how many jobs could be brought to locals from clean energy projects instead.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Cecile Gerner	Email:
Address: 6057 6th AVE NE Seattle WA 98115	Phone:

Carole: Thank you. The next one was Cecile Gernez.

Cecile: Hi. My name is Cecile Gernez. I'm an organizer with the Sierra Club. I want to acknowledge, like many people already did, that we are on Puyallup land, and we incorporate, by reference, the comments of the Puyallup Tribe. I'm speaking to you today not just as an environmentalist but as a trans, nonbinary millennial. We're already seeing the impacts of climate change. The wildfires this summer and the summer before are becoming a new normal. We're seeing larger and larger storms and floods.

[02:50:00] And entire nations are disappearing underwater from sea level rise. So, let's talk about the fires. It was dangerous to breathe the air outside this summer. And experts say that climate change is making fires worse. Nearly half of all of the young people experiencing homelessness in this country are LGBTQI plus. They're living outside, in large part, because they have been rejected from families, based on who they are or who they love. While governmental agencies like yourselves were telling people to stay inside and avoid breathing the air, members of my community had no choice because they live outside.

Climate change is only going to get worse, and it's a big cause of my anxiety as a millennial. I want to be able to breathe the air. I don't want people to die in storms. And I don't want people to lose their homes and their entire nations due to sea level rise.

[02:51:00] I'm here to ask you to deny the air permit for PSE's LNG facility. The draft SEIS does not account for the full and very real climate impacts this facility will have. We need you to study the full impacts and then, deny this permit. Methane, the main component of fracked gas is 87 times as warming as carbon dioxide. Fracked gas leaks up to 11% from extraction, transportation, storage, and processing. We're asking you to use a very conservative estimate of 3%, which represents the national average. You're a clean air agency. It's your job to make sure that people can breathe the air outside.

You have hundreds of people, in this room, tell you to stop this project and that this project will make it harder to breathe. Please listen and please stop this project. I also want to voice my concerns about the format of this hearing.

[02:52:00] Many people have had a hard time getting here on time because they weren't given numbers. So, in the future, giving folks

1121-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1121-2 14. LCA Inputs and Assumptions - Leakage/Slippage

numbers in line will help us know how much time we've got to make sure we're available to actually give comment. Thank you.

ear Port of Kalama, and Cowlitz County,

ear Puget Sound Clean Air Agency,

I Love Jobs, Please study how many jobs could be brought
o locals from clean energy projects instead.

2173-1 3. Outside of SEIS Scope

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Cecile Gomez	Email:
Address: 6057 6th AVE NE Seattle WA 98115	Phone:

2174-1-3. Outside of SEIS Scope

...ear Port of Kalama, and Cowlitz County,

...ear Puget Sound Clean Air Agency,

please study the impacts of Man Camps for building pipeline, fracking, and building of these projects on Indigenous women, and all other women.

...lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Cecile Gerner	Email:
Address: 6057 68th AVE NE Seattle Wa 98115	Phone:

2175-1 22. General Opposition

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

we need to get off fossil fuels NOW. please do not impair this project to other fossil fuels. Please Study the impacts of this project do not Waste our tax money studying other hypothetical projects.

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: Cecile Gerner	Email:
ddress: 6057 B th Ave NE Seattle, WA. 98115	Phone:

2176-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please study the chemicals involved in fracking. You cannot accurately reflect the impacts of this project without knowing all the chemicals involved

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Ceeile Gerner	Email:
Address: 6057 6th Ave NE, Seattle, WA 98115	Phone:

From:	Aaron Giddings
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Friday, November 16, 2018 8:48:41 AM

Name: Aaron Giddings
Email: swampminer@gmail.com
Address: 19030 SW Wright CT -
Beaverton, Oregon 97078

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

...

1297-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

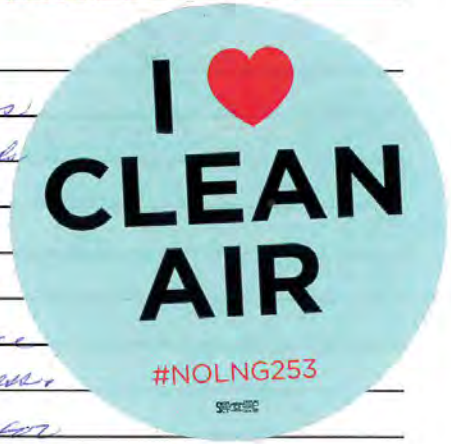
Name Rory Giddings

Address or email 12211 C St S Tacoma WA 98444-5118

The slow or sudden release of massive amounts of hydrocarbons into the atmosphere, where thousands of people live and work, makes the location of the LNG Facility Tacoma undesirable. No amount of mitigation, promises, or insurance money will make it a safe process.

Depending on another country for the basic raw material means that supply may be cut off at any time.

All pipelines and processes wear out over time and the pipelines available from US states are not clean or reliable now. Please deny this permit.



1712-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 5:44:50 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracked gas is NOT clean NOR safe NOR viable for the green, clean climate we need to restore Mother Earth! We need NEW green clean energy systems, not poisoned water and air from fracking, topped off by earthquakes. Enough madness!

Sincerely,

Valerie Gilbert
weareallone@verizon.net

1545-1 22. General Opposition

From: Hayden Gill
To: Public Comment
Subject: Comment on SEIS for LNG in Tacoma
Date: Monday, November 19, 2018 11:48:59 PM

Hello as a concerned citizen I beg you to not allow this project! There is a mountain of scientific evidence that fracking is extremely detrimental to the environment in multiple ways. It is not fair to the people of the area, the people that you represent. Please do not let a select few benefit at the cost of the rest of us. I have done quite a lot of research on this and it is obvious that it will be a massive pollution if it is allowed to happen. I am not alone. Many other people feel as I do, even if they do not take the time to write an email. Humanity must move quickly towards a cleaner and safer environment if we are to survive, and approving this project is a clear step backwards. Please do not allow this to happen. WE BEG YOU TO PROTECT THIS LAND!!! sorry for being dramatic but this is really serious. Have a good day.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101

November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) TACOMA, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

1345-1 22. General Opposition

From: Cadie Gilman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 5:34:31 PM

Name: Cadie Gilman
Email: cadie.elizabeth@gmail.com
Address: 6633 SE Rhone Street -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The idea of putting a natural gas refinery and distribution center in Tacoma is just insane. Consider just the past few months in this country- super charged storms in the SE US, alarming number of hungry and dead orcas in Washington state and historic and deadly fires in California. We must stop our dependence on these non renewable energy sources. Natural gas being slightly “better” than oil is not good enough. Never mind the damage to the immediate environment through any kind of accident. The Pacific Northwest could be a leader of responsible, clean energy. Not to mention the complete disrespect and disregard for Native people and their wishes. Do NOT approve this project

0306-1 22. General Opposition

98101-2509 1:
RECEIVED
OCT 25 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

Chris Glanz
211 Cap. Place
Ellensburg, WA 98926

SEPA Reviewer,

Please reject the SEIS on the LNG storage facility in Tacoma. It is a result of BAD Science and a Threat to the Climate. Thanks!

1805-1 22. General Opposition
1805-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Will Golding
To: Public Comment
Subject: Puget Sound Energy-LNG Facility Tacoma: Draft Supplemental Environmental Impact Statement Comment
Date: Wednesday, November 21, 2018 3:56:04 PM

My name is William Golding. I am a 26-year-old Tacoma resident living at 246 South Stadium Way, where I overlook Commencement Bay and the unauthorized construction of Puget Sound Energy's (PSE's) "proposed" Liquid Natural Gas facility in the Port of Tacoma. I am currently a graduate student in the Evergreen State College's Master of Environmental Studies program where I focus on interdisciplinary climate change studies. I am completing a thesis research report assessing existing climate change action plans within Washington state by Indigenous nation governments, county, city, intergovernmental, and non-governmental plans. Nine Indigenous nation governments, including the Puyallup Tribe of Indians, have institutionalized climate change adaptation plans to address ongoing and future local climate impacts by recognizing that only mitigating current levels of greenhouse gas emissions will not be enough in and of itself to stop current and future climate changes both globally and locally. Four county governments, twelve city governments, and a host of intergovernmental collaborations and non-governmental organizations have also institutionalized climate action plans across just Washington state. All of these efforts will be negated if PSE is allowed to complete this ill-advised fossil fuel development project.

In light of this understanding, I strongly encourage the Puget Sound Clean Air Agency (PSCAA) to reject PSE's Notice of Construction permit application, and support significant diverse community desires from the Puyallup Tribe of Indians, Tacoma residents, and many other Washington state residents who collectively comprise the constituents for which PSCAA represents in this governmental permitting process. If PSCAA requires the contracted consulting firms Ecology and Environment, Inc. and Life Cycle Associates, LLC. to reassess this initial draft supplemental Environmental Impact Statement independently and fill in the many gaps in knowledge they will come to a much different conclusion than that presented in the current draft. This review is not adequate in assessing the initial values of greenhouse gas emissions implications presented by PSE and relies on incomplete leakage rates from fracked

1805-2 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
1805-3 5. Regulatory Framework

methane source calculations to inform initial draft findings. As a concerned citizen and constituent of PSCAA, I feel this initial assessment effort does not uphold public trust, but instead relies on private economic interests of the subsidiary privately-owned transnational utility corporation PSE to benefit the interests of TOTE Marine for a cheaper fuel source. In light of the inadequate efforts put forth by the two initially contracted consulting firms, I feel it is in the public interest to hire new independent consulting agencies to cross reference the work completed to date and incorporate new research needs identified by the current public comment period. Having invested significant research efforts into related research I feel PSCAA would do well to consider contracting regional organizations such as Sightline Institute who have a number of research staff dedicated to similar LNG projects and can provide more targeted expert research to better inform decisions made in the name of public interests; or other consultants such as the Cascadia Consulting Group, Adaptation International, Earth Economics (a Tacoma based non-profit organization), Geos Institute, EcoTrust, or even the public academic institution of the University of Washington Climate Impacts Group. Below, I present a number of pointed concerns to the current draft SEIS report, and believe if these concerns are adequately answered that PSCAA will then come to the same conclusion that myself and many other passionate stakeholders have arrived at, which is to deny the Notice of Construction permit application for PSE's LNG processing plant.

I want to acknowledge that I am a guest living on the lands of the 1854 Medicine Creek Treaty and specifically for this local area the ancestral lands of the Puyallup Tribe of Indians. This statement is also true for PSE's connecting pipelines to the processing facility and metering station. The 1854 Medicine Creek Treaty established a nation-to-nation relationship between the sovereign nations of the United States of America and presently federally recognized tribal governments including the Puyallup Tribe of Indians, the Nisqually Indian Tribe, and the Squaxin Island Tribe, as well as the non-federally recognized Steilacoom Tribe and a host of other smaller bands of sovereign nations who have been forced to be conglomerated into the aforementioned federally recognized tribes. The signing of this treaty between sovereign

1805-3 cont'd 5. Regulatory Framework
1805-4 5. Regulatory Framework
1805-5 5. Regulatory Framework

nations reserved inherent rights by Indigenous nations and peoples while granting access rights to the United States of America and its peoples. Article III of this treaty reserved rights to fish, hunt, and gather foods and other culturally important natural resources on usual and accustomed areas throughout the ceded treaty territory. These rights were reaffirmed by the 1974 Boldt decision and upheld by the U.S. Supreme Court' 1979 ruling in *Washington v. Washington State Commercial Passenger Fishing Vessel Association et al*. These processes reaffirmed not only access to these areas and resources, but also co-management status between treaty tribes and the state of Washington as part of the nation-to-nation relationship established by treaty agreements.

These fundamental rights are directly impacted by PSE's unauthorized construction efforts of the LNG processing facility on illegally dumped fill over the Puyallup River estuary (this 'land' is technically outside of the Puyallup reservation), which violates the 1854 Treaty rights to usual and accustomed fishing and gathering areas that no longer exist due to significant development impacts and associated filing of the area. The installation of the facility's source pipeline has been installed illegally on the Puyallup Tribe of Indians reservation lands without their legally required consultation and approval of consent.

PSE's and other associated permitting agencies' actions are both illegal and in violation of treaty rights as well as PSE and any other state jurisdictions who failed to adequately and meaningfully consult with not only the Puyallup Tribe of Indians, whose reservation lands and peoples are impacts by this project, but also the other Medicine Creek Treaty Tribes who have co-management rights to these impacted lands and waters including the Nisqually Tribe of Indians, the Squaxin Island Tribe, and The Northwest Indian Fisheries Commission who act as an inter-tribal governmental representative for the waters of the Salish Sea (Puget Sound). These legal violations present extreme concerns with the construction and oversight to date of the entire planning, permitting, and unauthorized construction.

1805-6 5. Regulatory Framework
1805-7 5. Regulatory Framework

I have significant concerns with the draft SEIS presented by PSCAA because there is no recognition of the role that this agency, as a representative of Washington State, plays in the nation-to-nation relationship between sovereign Indigenous Nations and the sovereign states that comprise the federal government structure of the United States of America. Nowhere in this report is there a recognition of PSCAA's responsibility to consult the treaty tribes regarding what goes into consideration for deciding on the Notice of Construction permit application process. Further, this report presents a table of required agencies for approval of the project on pages III-IV but fails to recognize fellow Medicine Creek Treaty Tribes including Nisqually Indian Tribe and the Squaxin Island Tribe. I believe this error is the direct result of PSCAA failing to acknowledge the 1854 Medicine Creek Treaty in this report and the required responsibilities of this treaty agreement regarding co-management rights and requirements for consultation to determine sovereign Indigenous nations' consent on this project. This omission must be corrected for the final draft of the SEIS to provide a valid representation of the legal framework within which this decision is being evaluated.

Words acknowledging the Medicine Creek Treaty are vitally important, and also need to be displayed through visual representation in the form of maps. The two maps present at the end of Section 1 on unnumbered pages need to be enhanced to include missing data. The first map only lists the title of the Puyallup Reservation, but fails to recognize any political boundaries of the reservation lands; as well as is woefully too small, as a sub-map image, to be the only representation of this sovereign nation. Two additional full page maps need to be added to this report; one to document the extent of the Puyallup Reservation related to the LNG processing site and the currently omitted installed pipeline connection between the processing facility and the Frederickson Metering station where the gas is sourced from the Northwest Pipeline in conjunction with documentation of the predevelopment shoreline and boundaries of the Puyallup River estuary (as accurately as possible); the second added map needs to document the full geographic extent of the 1854 Medicine Creek Treaty territory and associated tribal governments in relation to this project so that all Tribal governments with co-

1805-7 cont'd 5. Regulatory Framework
1805-8 5. Regulatory Framework
1805-9 5. Regulatory Framework

management rights to these areas are represented and can be adequately and meaningfully informed regarding this project's impact.

The draft SEIS presents inherent concerns by the ways in which values and impacts have been determined as a result of solely viewing the proposal through a colonial/Western cultural lens of the world in relationship to this this project. It is important to recognize that colonial/Western culture is only one world view out of many others exist from different cultures, especially within the area of this project. A fundamentally different cultural/world view present within this area is that of Indigenous cultures, which have been documented above to have not been adequately engaged, and that these unique cultural concerns are not considered in this current draft of the SEIS. A model framework that PSCAA and the contracted consultants should apply to updates for this impact assessment comes from the Swinomish Indian Tribal Community's (based in the coastal area between Anacortes and La Conner, WA) 2010 Climate Adaptation Action Plan, on page 28 documenting health factors and associated indicators including:

Community Cohesion – participation & cooperation; roles; familiarity
Food Security- availability; access; sharing
Ceremonial use- gatherings & ceremonies; giving thanks; feeding the spirit
Knowledge Transmission- the teachings; elders; youth
Self Determination- healing; development; restoration

Considerations such as these, and similar work by Dr. Jamie Donatuto, need to be equitably addressed in the final draft SEIS to make an informed decision regarding the granting of the Notice of Construction permit. To assess how accurately these health factors and indicators are utilized, the updated drat of the SEIS needs to consider this as a process of decolonizing existing colonial structures like Environmental Impact Review processes, and instead seek to help these processes provide justice for Indigenous nations, peoples, and cultures. In 2016,

1805-9 cont'd 5. Regulatory Framework
1805-10 5. Regulatory Framework
1805-11 3. Outside of SEIS Scope

Julia Miller Cantzler PhD, JD from the University of San Diego and fellow researcher Megan Huynh at the University of Arizona analyzed how striving for environmental justice for Native American communities can also act as decolonization by applying a methodological approach that takes into account considerations of distributive justice, i.e. geographic proximity to environmental injustice sites; procedural justice; i.e. allowing all people to engage in a meaningful way in the process and take into account how cultural differences may dictate this process be carried out alternatively from status quo colonial government approaches; and justice as recognition, similar to topics covered earlier regarding recognizing the existing history of treaty rights.

As an environmental impact assessment, this draft SEIS is woefully inadequate throughout Section 4. There is a lack of recognition of GHG emissions reduction policies outside of Washington state goals and need to be expanded to include the City of Tacoma's 2008 Climate Action Plan's GHG emission reduction targets, Pierce County's Climate Resilience Strategy, and the Puyallup Tribe of Indians' Climate Change Impact Assessment and Adaptation Options report. Section 4.2 is woefully inadequate as not a single species or ecosystem type are considered in the assessment, let alone that these have already faced serious degradation from a history of polluting industrial development. Failing to account for environmental impacts on individual species including salmon, orca, shellfish, western red cedar trees, native berries, camas, and other culturally important species for food and traditional material use fails to adequately consider the rights and interests of Medicine Creel Treaty Tribes. Also, to adequately assess impacts to individual species, this report needs to also consider the various ecosystem types within which they exist for survival and how the functions of these ecosystems are impacted including open water and near shore marine ecosystems, aquatic freshwater ecosystems, various wetland types, estuaries, mudflats, forests, prairies, mountains and glaciers, and other critical ecosystems. Earth Economics should be consulted for financial assessments of these ecologically important areas to conduct ecosystem service valuations to include in a cost benefit analysis of this proposed project.

1805-12 3. Outside of SEIS Scope
1805-13 22. General Opposition

Section 4 of the draft SEIS also fails to consider ongoing and future climate change impacts occurring locally, and needs to be updated for the final draft. The singular reference to the global impact of climate change and a deference to acknowledge these impacts further in the current draft of the SEIS fails to recognize ongoing impacts and how these will be exacerbated at the local scale. Only talking about climate impacts at a global scale fails to address ongoing local impacts like rising sea levels, ocean acidification, rising air and water temperatures, greater extremes in precipitation patterns with more frequent and intense rainfall events in the winter and greater droughts in the summer, impacts on water quality and quantity at various points throughout the annual seasonal cycles, and increasingly more intense wildfire events. The final draft needs to include the most up to date science on these understandings locally presented by the University of Washington Climate Impact Group's 2015 State of the Knowledge report, the 4thNational Climate Assessment that represents climate science understandings by regions of the U.S., as well as the most recent 2018 Inter-governmental Panel on Climate Change (IPCC) report documenting the drastic need for action to address climate change impacts.

These updated environmental understandings can only be assessed properly if the most up to date and accurate projections of the GHG emissions are present in the assessment of this proposed project, which is currently not the case with the under reported internally assessed emissions values by PSE for the initial EIS report and have been taken at face value for this current draft of the SEIS by contracted consulting firms. I attended the public comment hearing on October 30thand heard many citizens advocate for not questioning the "sound science" presented in this draft SEIS, and feel the need to address those misguided sentiments that fail to recognize the misrepresentation of facts regarding the impacts of this project. Also, to not question "science" allows results found to not be verified accurately. The only way to distill accurate scientific findings is to check the validity of those findings, and if they are found to be wanting then it is the responsibility of scientific researchers to reassess the process until

1805-14 22. General Opposition
1805-15 13. LCA Inputs and Assumptions - Natural Gas Source
1805-16 12. LCA Inputs and Assumptions - Global Warming Potential Value
1805-17 3. Outside of SEIS Scope

sound results are documented, presented, and then verified upon scrutinizing review. PSCAA is in this process right now, and many of the current presented findings are missing significant validity and have not been verified.

The current utilized emissions calculations have not been independently researched, documented, and calculated to provide an accurate assessment. The presupposed leakage rates of methane during the fossil fuel extraction process (predominantly fracking) are well below the rates observed by independent research reviews by numerous research entities. It has also recently come to light that numerous British Columbia fracking operations have been grossly underreporting their own leakage rates (the same fuel sources proposed for this project).

In light of the knowledge that methane released directly into the atmosphere is a much more potent GHG, almost 80 times more potent as an equivalent to carbon dioxide, raises significant concerns for the utilized calculations and the conclusions that can be drawn regarding the climate impact of this proposed facility. With the current draft exclusively relying on the assumption that the vast majority of methane extracted will be captured and combusted to be emitted as carbon dioxide fails to adequately reflect the reality of the entire lifecycle processing methane into LNG for a marine shipping fuel source.

It is commendable that PSCAA is striving to account for upstream impacts associated throughout the lifecycle of LNG production as this approach is currently not widely practiced. However, as many new processes go, there is significant room for improvement and refinement to work towards a more holistic review of the lifecycle impacts of a project like the proposed LNG processing facility. Outside of the limited scope of emissions leakage rates of methane from upstream fracking extraction processes, this draft SEIS also fails to account for the environmental impacts to upstream local communities near these extraction areas. Similar sentiments expressed earlier in my statement related to the need for assessing impacts to a

1805-17 cont'd 3. Outside of SEIS Scope
1805-18 3. Outside of SEIS Scope

wide range of species and ecosystem types near the proposed processing facility also need to be reviewed for upstream impacts such as: significant fresh water extraction for fracking purposes; the impact of radioactive materials used by these operations leaking into the local environment and ground water; the effects of fracking processes contaminating drinking water sources for people, livestock, and many species in the environment from uncollected natural gases; extreme increases in cancer rates within surrounding communities; decreased air quality from increased heavy industrial traffic; significantly increased rates of traffic accidents and deaths in many rural areas that do not have roadways and law enforcement capacity to serve increased usage by large industrial vehicles; greater prevalence of harmful drug use brought in by the fossil fuel employees in the man camps who make lucrative amounts of money in short amounts of time and both use of illicit substance for the stimulating effects of various drugs to work long shifts as well as recreationally because they do not have much to do in these foreign areas outside of working hours, and associated with these worker man camps also comes significant increases in violence against women with increasing rates of sexual assaults and murders especially for Indigenous women who often lack legal protections from greater rates of predatory men who work in these fossil fuel industries, in some cases due to their past criminal history that limits their job opportunities in other fields of work .

A major oversight with the current draft SEIS is the lack of acknowledging impacts of environmental injustices existing both at the location of the LNG processing facility construction in the Port of Tacoma as well as upstream related to the topics mentioned in the paragraph above related to environmental pollution and the phenomena of violence against women that has resulted in the establishment of social movements like Missing and Murdered Indigenous Women (MMIW). The areas surrounding the Port of Tacoma face significant existing environmental injustices as documented by the U.S. EPA’s EJ SCREES Tool that maps various environmental justice factors of concern. This draft SEIS fails to acknowledge these already unacceptable levels of risk for local communities. Each variable present on this tool

1805-18 cont'd 3. Outside of SEIS Scope
1805-19 3. Outside of SEIS Scope
1805-20 3. Outside of SEIS Scope

should be mapped and added to this report so anyone reviewing the next draft SEIS is aware of existing environmental justice concerns related to this projected project's impact assessment.

Some people argue that establishing the use of LNG over diesel fuel will address local environmental justice concerns from diesel particulates matter produced in combustion leading to air pollution, but a shift to LNG will not create the benefits some may imagine related to TOTE Marine's current burning of diesel fuel. TOTE chooses to not currently use the cleanest burning diesel fuel options based purely on economic desires to minimize operating costs. TOTE also already utilizes tug towing into port and shore power while docked in Port, meaning they are not burning diesel fuel and adding to the local air quality concerns that derive from many other stationary industry operations in the Port of Tacoma area. These factors need to be present in an assessment of the environmental injustice impact related to the proposed construction and operation of the LNG processing facility.

I have fundamental concerns with the structuring of the draft SEIS where a dichotomy has been created in assessing the Proposed Alternative and the No Action Alternative. This view is deterministic in that it assumes if the Proposed Alternative is not approved then no other actions will be taken to reduce existing emissions from the burning of diesel fuel for marine shipping. A number of public comments were stated at the October 30thcommunity forum supporting the current draft SEIS and advocating for PSCAA to approve PSE's NOC permit application based on the grounds that the, in my opinion currently inadequate/ not truthful, emissions comparison shows implementing the LNG processing facility will achieve needed emissions reductions to mitigate climate change impacts. Even if these calculations were correct, which I believe them to not be, the reduction of emissions by about 13% is not enough to avoid climate catastrophe, and would lock in that emission level for at least the next 40 years because a public investment this large would not be shut down easily even if it is shown to have negative consequences after it becomes operational. Operators like TOTE

1805-20 cont'd 8. No Action Alternative
1805-21 7. SEPA Alternatives

Marine will also be less likely to adapt more innovative and efficient technology after converting their fleet of ships to run on LNG meaning innovation for more efficient actions will be limited to only meet the standards of a 'Band-Aid solution' like LNG.

A similar situation has occurred while moving towards shutting down the polluting coal power plant in Centralia, WA. This example shows that it is difficult to move away from significant infrastructure investments as well as the jobs that people have become intertwined with significant resistance to moving towards more sustainable alternatives because of the political, economic, and social opposition of corporations, workers, and their families. Washington state also has a legacy of allowing failed energy infrastructure project to be built with regards to the extensive nuclear power plant facilities built near Elma, WA and the Tri Cities area during the Washington Nuclear Projects costing taxpayers billions, and it appears history is set to repeat itself by having not stopped PSE from irresponsibly and recklessly constructing the facility without approval and wasting significant public tax dollars in the process.

I believe that in the span of the next 40 years more efficient and less dangerous technologies will be developed, especially if LNG sources are not publically subsidized for private gains. I believe a third alternative should be provided in the final draft SEIS that calculates the benefits achieved by going 100% renewable energy/ zero emissions within twenty years compared to the impact that operating LNG for at least 40 years. An alternative such as this will provide projections to show the costs and benefits of holding out from making this significant investment in a marginally better at best proposed alternative for LNG. This alternative instead recognizes that we as a society have the ability and will do much better in the future with incentives to achieve this needed change by not allowing false solutions like LNG as a 'green' fuel source to dictate a clean and renewable energy future. Approving this project locks our region and our planet into an unstable future that will be significantly altered by climate change. Approving LNG will not meet both 2020 or 2050 emissions reductions needs, as it will still produce significant emissions well past these important institutionally mandated

1805-21 cont'd 8. No Action Alternative
1805-22 3. Outside of SEIS Scope

target action dates. Even if it may be more efficient than current diesel fuel (which is highly debatable), the benefits for PSCAA constituents still remain highly skeptical at best.

One gentleman at the October 30th community forum stated how TOTE Marine provides a vital service of shipping food to Alaskans and that this service needs to continue but could be made more efficient. I want to address that this statement is grounded in a deficit mindset, believing that food does not exist in Alaska and it must be shipped in for people to continue living in this region. This thought process is grounded in the colonial maritime dominated paradigm believing goods need to be shipped around the world to meet needs that would otherwise go unfulfilled. This is a false assumption, as food and materials for subsistence have existed and continue to exist all around the world including Alaska, and that the only purpose of supporting a shipping industry is the ability it provides to concentrate gains of wealth and power by a select few operating that industry and associated supporting industries such as fossil fuel development. The emissions produced by TOTE Marine from burning diesel or LNG (as well as all other uses of fossil fuels) continue to fundamentally erode the ability of Alaskans to live and support themselves with available native foods because regions closer to the Earth's poles continue to be impacted the most by severe climate changes. Allowing for the development of expansive LNG use will do nothing to address these impacts, but only provide better profits for the shipping industry at the expense of Alaskan communities they claim to support.

Finally, I come to a topic that is central to this proposal that has not been adequately addressed in the draft SEIS or any other materials submitted by PSE regarding the safety of operating this facility and the pipelines that will feed it. Significant natural disasters are a reality living in this region ranging from major earthquakes, to volcanic eruptions, to tsunamis and more. Having massive quantities of a highly flammable and explosive substances proposed to be stored at unrealistic temperatures throughout the lifespan of this facility are unacceptable to all who live close to this facility or work within this area. No similar facility is

1805-22 cont'd 3. Outside of SEIS Scope
1805-23 3. Outside of SEIS Scope
1805-24 3. Outside of SEIS Scope

sited in such close proximity to a critical urban center, vital river estuary, critical regional interstate highways, a federal courthouse, a major local public transportation hub, a major international airport and several smaller airfields, numerous other highly explosive sources from numerous oil trains serving other operations in the Port, or the PraxAir processing facility directly adjacent to Interstate 5. The final draft SEIS needs to contain maps documenting the potential worst case scenario blast zone so all local residents and interested parties can be aware of the risks. The initial proposal by PSE vastly underestimates the range of a potential explosion and what would be impacted by such an event.

As this facility sits very close to sea level, the impacts of sea level rise present flooding concerns for critical components of the facility and if flooding results in loss of power the LNG fuel, requiring being kept at -260 °F, can rapidly expand leading to an explosion. The mapping of sea-level rise and flooding risks need to be present in the final SEIS draft to make an informed decision ruling on the permit application. All emissions scenarios for the proposal are incomplete unless they account for the potential emissions that would result in event of the LNG processing facility failure or points throughout the pipeline distribution system.

Another major concern that is not addressed in the draft SEIS or other permitting processes revolve around insurance concerns for this proposed project. There needs to be documented proof of insurance for this project that covers PSE, Puget LNG, and all other permitting entities including PSCAA and the City and Port of Tacoma because all will be liable if there is a major failure of the facility and subsequent explosion that puts many people, the local environment, numerous businesses, and many critical political systems institutions such as offices and courthouses at risk. Just having proof of insurance for this facility is not enough, because the ownership structure of both PSE and Puget LNG as owners and operators of this facility present numerous concerns as to the ability to hold these entities liable for a major disruption for this area. These entities are preemptively structured to be able file for bankruptcy and dissolve responsibility in the event of a catastrophic explosion and neglect their financial

1805-24 cont'd 3. Outside of SEIS Scope

responsibilities for these harms leaving the many public entities who have approved permitting for this project on the hook for these costs because an insurance company will most likely try to avoid paying on this impact due to the many fundamental problems inherent with this project. PSCAA must be able to ensure this is not the case so that taxpayers are not left paying for PSE and Puget LNG's mistakes while their parent companies are able to get away with the significant profits they will gain from this project.

In conclusion, the existing draft of PSCAA's SEIS remains significantly deficient and as a result incomplete and as such lacks the ability to make any type of informed decision based on presented findings in order to uphold public trust. If the permit application is approved upon a final draft similar in scope and analysis to the current draft then PSCAA will be responsible for violating Washington state residents' public trust, accepting liability for knowingly putting Tacoma residents in harm's way, and sanctioning the desecration of both the local environment and the entire planet by locking energy development into a fossil fuel dependent future at the exact moment we need the opposite in order to rapidly address runaway climate catastrophe. If PSCAA reassess the project and completes a fully informed final SEIS that takes into account the many missing pieces of information documented above, then I believe your organization will come to the same conclusions that many others and myself have come to regarding rejecting the application for PSE's Notice of Construction permit. A number of people did express opinions in support of approving this project at the October 30thpublic forum, as well as a number I would guess through online efforts, but more are opposed to this project. Some in support of the project may come to a different conclusion regarding their support for this proposal if they are able to receive a fully informed report for the SEIS to this permit application by addressing a number of the concerns that have been raised by myself and many other concerned people. PSE has already violated the public's trust by irresponsibly investing public funds into an unauthorized and widely opposed project and boldly constructed a facility without any oversight. Without following proper protocols, how well does anyone including the public know if the facility has been constructed up to proper safety

standards and independently verified by third party inspectors? Nothing about PSE's present actions are right or just, and they should not be rewarded with an approved permit just because they have already made a significant investment. PSE must be held accountable for their illegal actions. The lost funds already invested into this project should play no bearing in the review of the acceptability of this facility. PSCAA plays a critical role in ensuring justice for Washington state residents and our planet by rejecting this permit application to sop the impacts of this unauthorized disaster. Thank you for your public service to support the health and well-being of present and future generations of people and our shared planet.

1515-1 22. General Opposition

From: Howard Goldman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:42 PM

Name: Howard Goldman
Email: howgold91@gmail.com
Address: 11439 SE Market Street -
Portland, Oregon 07216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We all should be firmly opposed to any fracked gas use if we have any love for our children and grandchildren. Do not allow a few greedy capitalist to continue to destroy our planet. The supplemental EIS is clearly a criminally fraudulent effort to pretend this fossil fuel company is somehow attempting a lawful action.

Howard Goldman

1527-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1527-2 5. Regulatory Framework

From:	dell goldsmith
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, November 20, 2018 8:11:51 PM

Name: dell goldsmith
Email: dell.goldsmith@gmail.com
Address: 7150 sw newton pl -
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The dangerous LNG plan for Tacoma must be denied. Methane is much more potent in its damaging effects than has been acknowledged in this plan. It is also notoriously hard to contain and leaks at every step in its extraction, transmission and storage. This was not appropriately taken into account in the "environmental impact statement". Incursions onto tribal land against the wishes of tribal people should be prevented. Effects on ground water, air quality and destruction of invertebrate life are all consequences of this plan. We need your help to make a truly sound and careful examination of the risks including profound risks to our climate protection.

2192-1 22. General Opposition

From: aakgomez@everyactioncustom.com on behalf of Aaron Gomez
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 9:13:30 AM

Dear Responsible Official,

It is time that we transition away from the antiquated technologies of fossil fuels. The scientific data is clear that we need to reduce our carbon foot print fast. The newest climate modeling is showing us that even the 2050 Carbon Neutral goal that the Paris Climate Accord calls for is not soon enough. Leading countries are setting carbon neutral goals as early as 2030. The writing is on the wall that we will be switching to carbon neutral and carbon free energy sources. The question is will the fossil fuel comoanies help in that transition or hinder it... The fate of most life on this planet hangs in the balance.

Sincerely,
Aaron Gomez
San Luis Obispo, CA 93401
aakgomez@gmail.com

1379-1 22. General Opposition

From: Jeffry Gottfried
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 7:22:07 PM

Name: Jeffry Gottfried
Email: jeff@gottfried.net
Address: 7040 SW 84th Ave -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency
I'm m writing to urge you to deny the permit for Puget Sound Energy Liquufied Natural Gas project. I am alarmed by the climate change that I am seeing around me and the reports that I read from throughout the world.

It is urgent that we focus our efforts on development of renewal energy sources and continue developing more fossil fuel facilities.

With reporting on on leakage rates left to the polluters, you cannot rely on the claims and data of the developer of the LNG. facility.

Thank you for considering my point of view. Make you ur decision based upon the world in which you, your children and grandchildren want to live. Don't waste an opportunity to say no to developers of dirty, polluting fuels that are destroying our atmosphere and threaten human life in Washington and throughout the world.

1380-1 22. General Opposition

From: Jeffry Gottfried
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 7:21:08 PM

Name: Jeffry Gottfried
Email: jeff@gottfried.net
Address: 7040 SW 84th Ave -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency
I'm m writing to urge you to deny the permit for Puget Sound Energy Liquufied Natural Gas project. I am alarmed by the climate change that I am seeing around me and the reports that I read from throughout the world.

It is urgent that we focus our efforts on development of renewal energy sources and continue developing more fossil fuel facilities.

With reporting on on leakage rates left to the polluters, you cannot rely on the claims and data of the developer of the LNG. facility. Furthermore the proposed facility will bel

Thank you for considering my point of view. Make your decision based upon the world in which you, your children and grandchildren want to live. Don't waste an opportunity to say no to developers of dirty, polluting fuels that are destroying our atmosphere and threaten human life in Washington and throughout the world.

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:47:34 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

We must honor the treaties and have full cooperation of the tribes, or find another place. And regarding that other place, we must put ALL of our energies towards transitioning to clean energy and reducing the amount of energy we use. To do this we must change or perspectives. It's difficult, I know, but we must. As individual humans please put health first: for Native peoples, for Native - Non Native relationships, for people who breath air, for the children born now and in the future, who will face a difficult future because of climate change. It's the right thing to do.

Sincerely,

Gail Goulet
gailmgoulet@gmail.com
98230

2207-1 22. General Opposition

From: susangramentz@everyactioncustom.com on behalf of Susan Gramentz
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 12:32:25 PM

Dear Responsible Official,

I live in Norther Calif and can hardly see a claer bule sky these days mind u I am in the country. I beleive in all honesty enough damage have been done ot our environment the major corporations by pass all laws.. we figting a lossing battle we already know fracking causes earth quakes, just plaln bad for out Plaent period and u' all know that . were killing humans in th eprocess and eveything were standing on.. thank u for your time and consideration , Susan Gramentz

Sincerely,
Susan Gramentz
Shingle Springs, CA 95682
susangramentz@yahoo.com

0817-1 14. LCA Inputs and Assumptions - Leakage/Slippage

98101-3317730

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101



Anna Green
5615 Highwood Rd #124
Everett, WA 98203

10/22/18

Dear Manager of LNG Project:

Fracked gas is not as clean as was originally claimed & definitely not ~~as~~ cleaner than coal for energy production. We @ 350.org would like further study to determine how much methane actually leaks during production, storage, & transportation.

Thank You,
Anna Green

Steve: So, next is Suzanne Greenberg.

Suzanne: Hi. I'm Suzanne Greenberg from Vashon Island. And I'd first like to pay respect to the Puyallup Tribe because we are on their land. I'm not a scientist myself. But back in the '90s, I dated a climate scientist. Next best thing. And he used to do a program in schools, and I would tag along.

[04:16:00] And he would show all of the kids the different sources of greenhouse gases, greenhouse emissions. After going through the effects on the climate from driving, heating our homes, chopping down trees, he'd then throw up a picture of a field of cows. This was the kids' favorite slide in every school we went to because that's where they got to talk about cow farts and why methane from cows farting actually was a significant threat to the climate. The reason is because methane gas, while a substantially smaller contributor to the atmosphere, was a far more potent greenhouse gas.

As you've heard today, up to 87 times more potent than carbon dioxide. The cumulative effect of a field of cows farting actually does have an impact, as funny as that sounds and as much as he used this for their comic relief. For years, I heard about natural gas and what a clean fuel it was. It was touted as a transition fuel, even by environmental groups.

[04:17:00] And it seemed to be a promising alternative to oil. What I never knew, and I think many people don't know, is that the "natural" gas is mostly methane, the same highly potent greenhouse gas with such a huge impact from small quantities. The touting of "natural" gas, and I say natural in quotations because there's nothing really natural about it, has blown over a few essential truths. The first is that because the store of natural gas has been running lower, we're turning increasingly towards fracking for our source of this methane fuel. Fracking comes with more problems than I can list in this short statement.

And you've heard many people talk about all of the problems fracking causes. Contaminating the water tables, destabilizing the land, and even causing small earthquakes, in some places. What hasn't been accounted for, and maybe people have spoken tonight, is all of the leaks along the way.

[04:18:15] Now, if a cow fart can cause an effect on the climate, and it actually does, this is documented, each of those little leaks is

1224-4 22. General Opposition
1224-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1224-4 13. LCA Inputs and Assumptions - Natural Gas Source
1224-4 5. Regulatory Framework

having a big impact. Recently, several studies have proven that the amount of methane leaks has been grossly underreported, especially up in BC, which is where our source would be, by an industry that, largely, is self-regulating and is more interested in profit than appropriate regulation. With only a small amount of leakage required to equal the climate destructive impact of coal, it's three percent, our clean burning, natural gas is quickly being shown to be anything but that.

To properly assess the environmental impacts of this project and whether it's better than not having the plant built at all, you must take all of the impacts from source to burning into account.

[04:19:06] Leaks at the wells, leaks in the pipelines, bringing it down from BC or other places, methane slippage from the ships themselves. It's clear that, to me, this application should be denied. Cow farts from source to plant, though seemingly benign, create a climate impact that we can't afford. Investing in this fossil fuel infrastructure will tie PSE rate payers, which I am one of, for years to come, and have us funding our own demise. It locks us into decades of a fossil fuel future, with no proven climate change benefits. Meanwhile, advances in future shipping emission reduction solutions will be held out of the market.

The UN recently published the results of their most current study on climate change. And the warnings were dire.

Steve: Could you wrap up?

Suzanne: Yes. I'm on the last paragraph. They unequivocally state that, unless we, as a society, turn things around in the next 12 years on a massive scale previously unimagined, we're headed towards planetary destruction on a scale never before seen. The message is simple and clear. We need, as a society, to stop using fossil fuels as soon as is humanly possible. And yet, we sit here and debate if we should add yet another fossil fuel plant to the land. The Puyallup Tribe, a sovereign nation whose land this plant is being built on have strongly and firmly said no. The earth says no. We're all saying no.

It's time to draw a line and do what's right for the planet, our future, and future generations. Please deny this permit.

Steve: Thank you. Next is Grace Greene.

Grace: Good evening. My name is Grace Greene. I live in Gig Harbor. I am a mother. I am an environmentalist. I am a fisherman. I am an outdoor enthusiast. I love clean air. I am grateful for a community that is passionate about our environment. I am also the president of TOTE Maritime Alaska. I am new to this role, but I have been with the business for the past five years as the general manager in Alaska.

[06:13:00] I know first hand the importance of our business to Alaskans, as without it, we would not enjoy the quality of life that we do today. We would simply just not have groceries that are fresh, the goods or services that we depend on every day. I also know that giving back to our communities is one of our core values. As a multigenerational business and one of the founding companies here in the Port of Tacoma, it is important to us that we leave an opportunity and a legacy for our children and for their children. By converting our ships to LNG, we are on the leading edge of the safest and most environmentally beneficial maritime fuel available today.

And I am proud to be at the helm of a company that is doing so much for our community. We use shore power here in Tacoma.

[06:14:00] We are one of the only companies to do so. We have robust rain gardens. And we donate millions of dollars annually in in kind donations to organizations like ALPAR in Alaska, so that Alaskans can recycle. We are supportive of the findings and methodologies of the SEIS, and we'll look forward to continuing to lead the way on LNG. I am not just okay with meeting the requirements set forth by the EPA. I am okay with exceeding those requirements. And by converting our ships to LNG, we are doing that. There is no better alternative. We look forward to the final SEIS and the permits to move forward with this plant.

I am excited to see where we go, and I am excited to lead the way and to lead our company in doing so. Thank you so much.

2556-1 5. Regulatory Framework
2556-2 3. Outside of SEIS Scope
2556-3 10. LCA Calculations
2556-4 5. Regulatory Framework

From: Eddie Griffiths
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Sunday, November 18, 2018 6:44:47 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow ANY, REPEAT, ANY further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

1] The very initiation of this UNPERMITTED project has been amoral and illegal, conspicuously lacking in due consent of the Puyallup Tribal Council upon whose estuary it would reside. Production of LNG, when begun, would forever expose their adjacent Reservation to toxic down gassing with unacceptable medical consequences.

2] Another gross neglect adversely impacting both the Tribe as well as the broader community has been a frank discussion of the potential blast zone which would have a radius of 5 miles. This would devastate the entireity of the Port, the downtown core, and obliterate I- 5, schools & hospitals. This unimaginable scenario could be triggered by a tsunami, seismic event (tank is located on a zone) or crippling power outage. LNG must at ALL TIMES be cooled below -200 degrees. In addition any number of on site accidents to include fracked gas leakages, tank car explosions, or cargo ship collisions all conspire to preclude any consideration of this project to this site as proposed: i.e. Even the SEIS is fatally flawed with respect to treaty rights.

ATTEND TO INDIGENOUS RIGHTS--then you will protect our Salish Sea, its endangered orcas, salmon, & yes, climate catastrophe.

Additionally my concerns with this draft SEIS follow the guidlines outlinded by 350 Tacomaa: There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

3] Insufficient consideration has been given to subsequent phases of RIGOROUS EIS permitting of the fracting infrastructure for supply demands. Whether by pipelines or rail both have adverse consequences which Washington State by necessity must legally address PRIOR TO
With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best

available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Eddie Griffiths
eddiearvon@gmail.com
3820 Bagley Ave N
Seattle,, Washington 98103

2556-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
2556-6 12. LCA Inputs and Assumptions - Global Warming Potential Value
2556-7 19. LCA Inputs and Assumptions - End Use
2556-8 14. LCA Inputs and Assumptions - Leakage/Slippage
2556-9 13. LCA Inputs and Assumptions - Natural Gas Source
2556-10 14. LCA Inputs and Assumptions - Leakage/Slippage

1442-1 5. Regulatory Framework

From: Deena T. Grossman Grossman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 5:50:22 PM

Name: Deena T. Grossman Grossman
Email: deenatgrossman@gmail.com
Address: 7234 SE 17TH AVE -
PORTLAND, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To: Puget Sound Clean Air Agency
Please deny permission to Puget Sound Energy to build a LNG refinery in the Tideflats of Tacoma.

1. The proposed project is a direct affront to the Puyallup Tribe, putting their treaty rights and community at risk.
2. The Medicine Creek Treaty is the law of the land and has been violated throughout the process for this facility.
3. I stand with the Puyallup in opposition to the LNG facility. The Puget Sound Clean Air Agency and all agencies involved in permitting this facility still need to consult with the Puyallup Tribe.

Thank you for your consideration.
Deena T. Grossman, public school teacher

2198-1 22. General Opposition

From: leanne@everyactioncustom.com on behalf of Leanne Grossman
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 6:50:37 PM

Dear Responsible Official,

Stop another backward-looking wasteful energy boon doggle. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Reject it!

Sincerely,
Leanne Grossman
Oakland, CA 94602
leanne@portfolio-of-passions.com

Steve: Thank you. So, we're going to have time for two more comments, and then, we're going to have to close. Is Colleen Gray here? Art Chippendale? Rachel Gibbs?

[06:39:00] Matthew Gulick? Okay.

Matthew: So, thank you. Heads up, there's going to be some high flowing language coming in here. So, good evening. We're here commenting on the pragmatism of LNG's transitional fuel. While we continue to debate the facts on LNG, the severity of our climate situation doesn't have time for debate. Unfortunately, what corporate interests deem pragmatic and economically viable is not what's right, moral, or just. Colonialism was and continues to be a great for "economic growth". As I hope you've learned from indigenous peoples here tonight that doesn't make it good. It's not complicated.

We have to rise to and be better than our current moment in history. This is not an idealistic pursuit, but an existential necessity. As others have said, we have the power to change for the better right now.

[06:40:02] To break from the constraining systems we believe ourselves subservient to. What we lack collectively is an understanding of how fragile these systems really are. That understanding will come sooner or later. We will bear witness to that fragility either the easy way or the hard way. We don't need a transition. We can't afford it. This isn't an incremental step towards a better future. It's another path down the fossil fuel dependency. Please don't lock us in another pair of industry handcuffs just because they seem slightly more comfortable than our current pair. We need to remove the cuffs entirely.

In our accelerating climate of overwhelming information, consumption, and confusion, we don't need this LNG plant. We need perspective. Please review the draft Don't sell us out, and don't sell humanity short. We hope to do better than giving in to an economic system that limits our potential for incredible progress to pragmatism. Thank you.

Steve: Thank you.

1524-1 3. Outside of SEIS Scope
1524-2 5. Regulatory Framework

From: Jef Gunn
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:11:55 PM

Name: Jef Gunn
Email: zopa@hevanet.com
Address: 7919 SE Henry St -
portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Tacoma harbor and other waterways have experienced industry for at least a century now. It's already dirty water and shoreline. We should be cleaning it up, not bringing in more potential for disaster. Fracking is wasting water and chemicals to bring up more carbon. We already know that bringing up carbon is what causes and accelerates climate change. The project is flawed on principle. Ethics. And it is in the long run unwise. Besides, it's being developed on tribal land. I know this area. It belongs to the Puyalup Tribe. You're going to ruin good land that does not belong to you. How can this be construed as ethical?

1988-1 23. General Support

From: Stephen
To: Public Comment
Subject: PSELNG Permitting (GHG Lifecycle Clean Air SEIS)
Date: Tuesday, October 30, 2018 9:43:32 PM

I wish to encourage the Puget Sound Clean Air Agency to adopt the SEIS and permit the Tacoma LNG plant.

It was interesting and informative to learn that with sole sourcing of gas from Canada, that the overall level of Green House Gases will be a net drop over time. And that's with a very limited scope of operations. Scaled up and taking more ships out of bunker fuel and into cleaner fuel will necessarily increase the benefits of the operation of this project.

Further, in a timely event, there was a PSE gas line rupture in British Columbia that resulted in a number of stakeholders asking people in Tacoma and Puget Sound to do emergency conservation measures to manage the stoppage of gas distribution.

This lends itself to the thought that since we are already dependent on the gas line from BC, and that the line can be disrupted and limiting supplies to Puget Sound, that having an 8 million gallon tank locally to act as an emergency reserve is sound business and critical infrastructure.

This SEIS being limited to the life cycle GHGs related to every element (including fugitive gas emissions) where even in the worst case scenario and using figures that would not be necessarily be a direct result of the PSE LNG plant in Tacoma, we would see a decrease in the tons of atmospheric release of GHGs, is incredible. Considering that many of those actions and uses of GHG fuels would occur even without the PSE LNG plant actually lends the result to the concept that GHG net reduction as a result of the plant would be even better than projections.

I realize that this SEIS is limited in scope, and requested by groups that wanted another chance to find a way to defeat the plant. I see already in the news that even with this SEIS and solid methodology, not only are opponents trying to argue against the methodology and deny the results, but who are already trying to get another EIS ordered in the hopes of shutting down the permitting process.

I ask that the Puget Sound Clean Air Agency, while respecting the thoughts on all side of the issues regarding the plant, stick with the science and grant the permit on the basis of climate necessity.

Stephen Hagberg
Tacoma, WA

(I may add at this point, thought it's beyond the lifecycle of GHGs associated with the plant, that I do share concerns about the stability of the soil upon which the container is built upon, particularly given the seismic nature of the area, that we should proceed. Even in a complete rupture, given that the gas would be at a max of 3 psi, the danger to the area would be minimal. A lighter than air gas, there is no existential threat to shoreline, waters, habitat or resources in the area. Even given a complete rupture and the possibility of an explosion (based on methodologies of military Fuel/Air

explosives) any resultant detonation would hardly be of a catastrophic result. Would suck for the people in the immediate blast zone, but does not fit within the dire descriptions opponents put forth.

Finally, I wish to state that if opponents actually had viable options in which to complete the project in an acceptable fashion, I would be more inclined to engage them. As it is, the all/nothing, monkeywrenching, hopes of finding fellow travelers to enact their will in spite of science and need is all the more reason to grant the permit.)

Your Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2031-1 3. Outside of SEIS Scope

Thank you for addressing my concern:

Please consider the effect of the process of fracking on the water in the holding ponds. The water is not purified of the chemicals that have been added before it is pumped back into the ground.

Thank you.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Lin Hagedorn	Email: mountainclimber4@gmail.com
Address: 15418 210th Ave NE Woodinville WA 98077	Phone: 206.310.6203

Dear Puget Sound Clean Air Agency,

2034-1 3. Outside of SEIS Scope

Our nation is moving in the wrong direction — increasing the demand for natural gas, rather the renewables (a sustainable source of energy) we are increasing the demand for fracking - which is bad for the air, water, plant & animals & the planet!

Thank you.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Lin Haggadorn	Email: mountainclimber4@gmail.com
Address: 15418 20D Ave NE Woodinville WA 98077	Phone: 206.310.6203

Dear Port of Tacoma, and Sumner County,

Dear Puget Sound Clean Air Agency,

When developing the SEIS, please include the use of a power plant operating at full capacity as this will likely be the case. It is unlikely that the on-site fracked gas power plant will be able to operate @ a lower capacity or staggered production.

Thank you.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Lin Hagedorn	Email: mountainclimber4@gmail.com
Address: 15418 210 Ave NE Woodinville WA 98077	Phone: 206.310.6203

2037-1.3 Outside of SEIS Scope

ar Port of Kalama, and Cowlitz County,
ar Puget Sound Clean Air Agency,

2038-1 3. Outside of SEIS Scope

I do not believe that the new Tacoma LNG plant will mean the end of other GHG sources - coal, oil or bunker fuels. Please ensure that both SEIS documents to include the added environmental impacts of the proposals. Do not assume that these projects will displace other proposals.

Thank you.

ease include this impact in the Final Supplemental Environmental Impact Statement.

ame: Lin Hagedorn	Email: mountainclimber4@gmail.com
ddress: 15418 210 Ave NE Woodinville WA 98077	Phone: 206. 310. 6203

1593-1 3. Outside of SEIS Scope

From: Andrea Hakimian
To: Public Comment
Subject: LNG wrong for Tacoma
Date: Wednesday, October 31, 2018 5:37:36 PM

Dear Sir or Madam,

I write to strongly oppose the proposed liquified natural gas plant on the Tacoma tide flats. LNG is terrible for Tacoma and for the climate. Only a small percent of Tacoma's PSE customers will benefit from the plant, but Tacoma customers will pay ~40% of the cost of the facility - and profits go overseas to Australia. However, Tacoma will have to bear the brunt of any safety issues that arise. The port is already crowded, and in case of fire an evacuation would be extremely complex, especially since there is no nearby fire station.

LNG is a climate buster, with methane being its primary component, a known greenhouse gas 86 X worse as carbon dioxide. Fracking contaminates groundwater and leaks along pipeline infrastructure.

Do not permit this LNG plant! It does neither Tacoma nor our Earth any good.

Sincerely,
Andrea Hakimian

From: Alison Hale
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, October 30, 2018 12:06:38 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I am a long-time Tacoma resident and homeowner. I love this city and have chosen to raise my daughter here. I hope that those of us who care deeply about this region and our future can come together to find a better solution than allowing the stealthy implementation of a dangerous addition to our port.

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.

2228-1 10. LCA Calculations
2228-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2228-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2228-4 6. Purpose and Need

2228-5 13. LCA Inputs and Assumptions - Natural Gas Source
2228-6 13. LCA Inputs and Assumptions - Natural Gas Source
2228-7 14. LCA Inputs and Assumptions - Leakage/Slippage

- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Alison Hale
ahale2778@gmail.com
4419 N 30th st
Tacoma, Washington 98407

1530-1 22. General Opposition

From: Mimi Haley
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 7:43:17 AM

Name: Mimi Haley
Email: mimimhaley@msn.com
Address: 17125 SE Royer Rd -
Damascus, Oregon 97089

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

There is no environmental impact analysis that could justify a new fracking terminal in the Tacoma tideflats. In fact, anywhere. The fact is that everyone with any science behind them knows the solution is green, renewable, energy, not continue extraction and burning of fossil fuels. I grew up in Tacoma and remember when it was best known for its pulp mills, chemical plants and the dreaded Asarco smelter. It took generations to restore Tacoma as a jewel in the lower Puget Sound, a healthy place to raise children without the shadow of environmental devastation in its wake. Don't turn the clock back on Tacoma. End this flawed project now. Thank you, Marian (Mimi) Haley

1447-1 22. General Opposition

From: Cecelia Hall
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 9:25:12 PM

Name: Cecelia Hall
Email: Cecehall637@gmail.com
Address: 17006 NW Pauly rd. -
Portland, Oregon 97231

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources. I believe this project will increase greenhouse gasses and should not be built.

1743-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 10:00:56 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency is using an outdated methane global warming potential value – the most up-to-date modeling shows that the LNG plant is dirtier and more climate polluting than the heavy fuel oil currently used.

Sincerely,

Fred Hall
hallaway2004@msn.com
98508

1877-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

THE LGN TANK IS ON TRIBAL LAND, SO IT IS ILLEGAL FOR THIS PROJECT TO GO FORWARD

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: MICHAEL HALL Email: MICHAELHALL1976@GMAIL.COM

Address:

By completing this comment card you agree to receive updates about the project.

1878-1 3. Outside of SEIS Scope

Name _____

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

WHAT HAPPENS TO THE SITE WHEN THE EARTHQUAKE HAPPENS FROM THE CASCADIA SUBDUCTION ZONE? IT WILL BE AN 8 POINT OR 9 POINT EVENT

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: MICHAEL HALL Email: MICHAELHALL8V6@GMAIL.COM

Address: _____

By completing this comment card you agree to receive updates about the project.

1879-1 3. Outside of SEIS Scope

Name _____

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

WHAT IS WORSE CASE SCENARIO REGARDING
PUBLIC HEALTH HAZARDS & ENVIRONMENTAL DAMAGE ?

(Check here to continue comments on the other side). ☐ ➡

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: MICHAEL HALL Email: MICHAELHALL1846@GMAIL.COM

Address: _____

By completing this comment card you agree to receive updates about the project.

1791-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:33:17 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Megan Halliburton
megan.halliburton@gmail.com
98290

From: hhhallman@everyactioncustom.com on behalf of Holly Hallman
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Tuesday, October 30, 2018 9:02:31 PM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project. The tidelands are a bad choice because of how they will behave in a serious (9.0) earthquake. A disaster will affect the people least able to survive. Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Rev. Holly Hallman
675 S Point Rd Port Ludlow, WA 98365-9296

2570-1 22. General Opposition
2570-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2570-3 13. LCA Inputs and Assumptions - Natural Gas Source
2570-4 7. SEPA Alternatives
2570-5 19. LCA Inputs and Assumptions - End Use
2570-6 10. LCA Calculations
2570-7 22. General Opposition

1522-1 22. General Opposition

From: Laura Hanks
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:01 PM

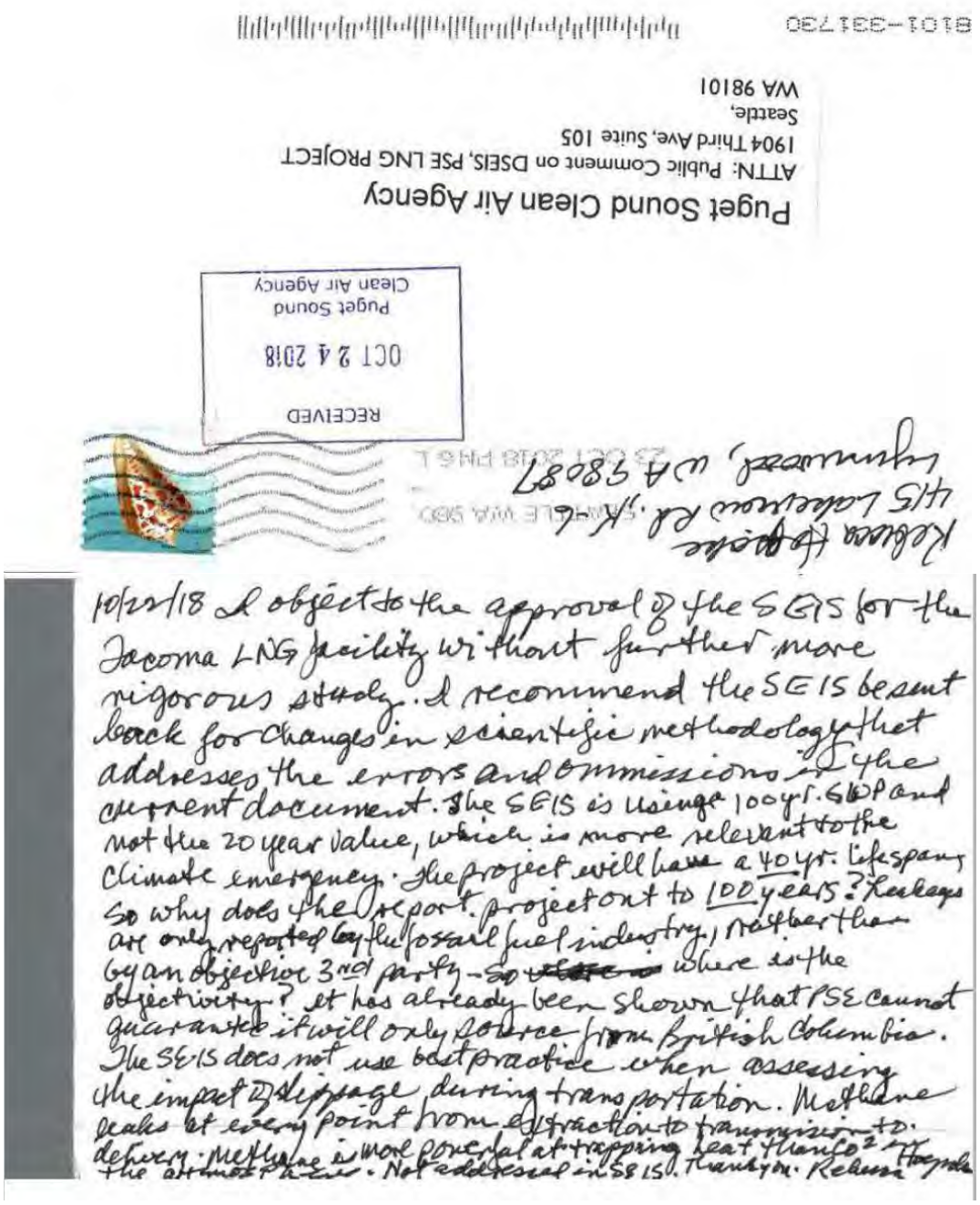
Name: Laura Hanks
Email: laura.hanks@comcast.net
Address: 6281 SE Deering Ct -
Milwaukie, Oregon 97222

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

No LNG plant in Tacoma is worth the climate ramifications.

0812-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0812-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
0812-3 14. LCA Inputs and Assumptions - Leakage/Slippage
0812-4 13. LCA Inputs and Assumptions - Natural Gas Source
0812-5 14. LCA Inputs and Assumptions - Leakage/Slippage



Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

Kathleen Roos
415 Lakemoor Rd. SW
Lynnwood, WA 98087

10/22/18 I object to the approval of the SEIS for the Tacoma LNG facility without further more rigorous study. I recommend the SEIS be sent back for changes in scientific methodology that addresses the errors and omissions in the current document. The SEIS is using 100yr. GWP and not the 20 year value, which is more relevant to the climate emergency. The project will have a 40yr. lifespan So why does the report project out to 100 years? Leakages are only reported by the fossil fuel industry, rather than by an objective 3rd party - So ~~there is~~ where is the objectivity? It has already been shown that PSE cannot guarantee it will only source from British Columbia. The SEIS does not use best practice when assessing the impact of slippage during transportation. Methane leaks at every point from extraction to transmission to delivery. Methane is more powerful at trapping heat than CO_2 in the atmosphere. Not addressed in SEIS. Thank you. Kathleen Roos

1445-1 22. General Opposition

From: Kristin Harman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:10 PM

Name: Kristin Harman
Email: Kristin.e.harman@gmail.com
Address: 9022 SE Lincoln Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Basics: Government is in place to provide and protect the general welfare of its people. It needs to veraciously stand by this obligation. The best way forward for all people is to think forward into the future.

The situation: LNG infrustructre investments are not going to serve us well now or in the future; climate change. The proposed project also has not been given consent to build on tribal lands.

Recommendation: We need investments in true clean energy: reneables such as wind, solar, geothermal combined with energy efficiency upgrades made accessible for your people.

1471-1 22. General Opposition

From: Bill Harria
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 9:45:26 PM

Name: Bill Harria
Email: bbharris1936@gmail.com
Address: 2803 NW Cumberland Rd -
Portland, Oregon 97210

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Gentle persons:
The claim that burning the natural gas proposed to ship from Tacoma would result in release of less GHG than not burning it must be based on unjustifiable presumptions. It is simply firmly true that the owners of fossil fuel and those making money in handling and burning it must not make use of this fossil fuel if life including that of us humans are to survive.

I want us to survive.

1342-1 22. General Opposition

From: Charlie Harris
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 7:57:08 PM

Name: Charlie Harris
Email: charris1@frontier.com
Address: 19400 NE Jaquith Rd -
Newberg, Oregon 97132

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I appreciate your willingness to look at the long-term effects on climate change. The proposed plant will do more to accelerate climate change than to reduce it.

I am particularly interested in the environmental justice impacts of the plant. Perhaps I should say, "environmental injustice." The adverse impacts on local low-income and minority neighborhoods are sufficient to base a permit denial on.

Thank you for the opportunity to provide this comment.

1955-1 23. General Support

From: Jon Harris
To: Public Comment
Subject: Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 9, 2018 6:18:57 PM

To whom it may concern,

I support the PSE Liquefied Natural Gas project in Tacoma.

This project is critical to the continued relevance of our ports in the Pacific Northwest. LNG is a key fuel for the shipping industry world wide and is called out as a means for the International Maritime Organization (IMO) to achieve the GHG goals it has laid out, not to mention that this is a fuel that fully complies with all ECA and fuel regulations current and upcoming in 2020.

Additionally the project will allow for PSE to avoid the future cost and emissions of building an expanded pipeline for natural gas into our region to reliably supply the growing demand from residential and business customers.

Finally as more renewable natural gas becomes available in the state, this plant will allow for the liquefaction of this renewable fuel and supply that to transportation customers in all kinds of applications. This would make the benefit of this project even larger as renewable sources come available.

This is one issue with your recommendation for the supply source of natural gas to be confined to British Columbia on the permit. If a large supply of renewable gas becomes available in other locations, it may prevent PSE from using that in their LNG plant.

Regards,
Jonathan Harris.

Get Outlook for Android

Steve: Thank you. Todd Mitchell?

[06:20:00] Sarah Smith? Carolyn Hartt?

Carolyn: First off, I'm Carolyn Hartt. And my great grandparents moved here at the turn of last century and were part of the colonization. I'm honored to stand with the Puyallup Tribe and other First Nation people whose land we've stolen. It strikes me that the realization that both of the opinions presented or both of the options presented by those in favor of the PSE plant are fossil fuel alternatives.

[06:21:00] It's a fallacy of reason. The October 8 IPCC report demands that we make radical changes. Let us not be guilty of too little too late. A methane storage facility should never be located in a populated zone because of the inherent combustibility of the vapors. Additionally, methane gas is toxic and contributes exponentially more than even CO_2 emissions to the greenhouse effect on the atmosphere. Folks are very aware of this. Leaks during normal operation conditions are inevitable. Any denial of that reality is indefensible.

Sorry, I didn't mean to make that rhyme. In the event of an earthquake or lahar, the spill and explosion would be catastrophic for the tide flats, for the port, for all of the high paid jobs that this brings, for Tacoma, for Federal Way, Milton, Puyallup, and Fife.

[06:22:08] It would be catastrophic. I live in the blast zone in South Tacoma. So, I can't imagine the aftermath of that. The continued development and investment of fossil fuels is absolutely the wrong way for our economy and our health. I'm running out of time. In conclusion, it isn't too much to ask our leaders to be courageous in the face of the fossil fuel corporations. Thank you.

1119

1119-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1119-2 3. Outside of SEIS Scope

1821-1 5. Regulatory Framework

From: Alan Harvey
To: Public Comment
Subject: Supplemental EIS on Tacoma LNG project
Date: Sunday, November 18, 2018 1:57:35 PM

The Puget Sound Clean Air Agency holds the power to grant or deny a key permit for the Puget Sound Energy Liquefied Natural Gas project in Tacoma. Finding the initial Environmental Impact Statement lacking, you opened up a Supplemental Environmental Impact Statement process to take into account the life cycle impacts of natural gas.

Thank you for doing this.

I completely object to the placement of this facility on tribal land without their consent, and to the obvious damage such a plant would contribute to our environment.

The dangers of climate change are all around us. The acceleration of damage is obvious. If the PSCAA allows PSE to do this, it will find itself humiliated by likely subsequent events. You must understand that the plant is in the wrong place doing the wrong thing.

Alan Harvey
4420 SW Admiral Way, #206
Seattle, WA 98116

1385-1 22. General Opposition

From: Linda Hayden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:18 PM

Name: Linda Hayden
Email: linda.hayden3@gmail.com
Address: 11437 SE Pine Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please STOP building fossil fuel monuments! Stop fracking! Stop pushing what we know is bad for the actual survival of the human race! You have the human race in your hands.

1395-1 22. General Opposition

From: Linda Hayden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:05 PM

Name: Linda Hayden
Email: linda.hayden3@gmail.com
Address: 11437 SE Pine Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please STOP building fossil fuel monuments! Stop fracking! Stop pushing what we know is bad for the actual survival of the human race! You have the human race in your hands.

1411-1 22. General Opposition

From: Linda Hayden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:53 PM

Name: Linda Hayden
Email: linda.hayden3@gmail.com
Address: 11437 SE Pine Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please STOP building fossil fuel monuments! Stop fracking! Stop pushing what we know is bad for the actual survival of the human race! You have the human race in your hands.

1421-1 22. General Opposition

From: Linda Hayden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:41 PM

Name: Linda Hayden
Email: linda.hayden3@gmail.com
Address: 11437 SE Pine Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please STOP building fossil fuel monuments! Stop fracking! Stop pushing what we know is bad for the actual survival of the human race! You have the human race in your hands.

1432-1 22. General Opposition

From: Linda Hayden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 6:41:38 AM

Name: Linda Hayden
Email: linda.hayden3@gmail.com
Address: 11437 SE Pine Ct -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please STOP building fossil fuel monuments! Stop fracking! Stop pushing what we know is bad for the actual survival of the human race! You have the human race in your hands.

1966-1 23. General Support

From: Brian Haynes
To: Public Comment
Subject: LNG
Date: Wednesday, November 21, 2018 12:31:01 PM

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

We need new technology and innovation to improve our air quality.

I would urge the Puget Sound Air Agency (PSCAA) to complete your Supplemental EIS review of the LNG Facility and TOTE's conversion to LNG powered ships in a timely manner and consider the following information:

The maritime industry currently uses diesel to power their ships.
There is no current Federal or State air quality requirement to do more than diesel at this time.
The use of LNG as a maritime fuel results in significant emissions reductions.
LNG reduces particulate matter, sulfur dioxides (SOx) and nitrogen oxides (NOx). SOx by 100% particulate matter by 99%. NOx, by 90% and according to the PSCAA's own conservative estimate, LNG use will reduce greenhouse gases by 13.5%
Without the conversion to LNG, maritime ships will default to the use of diesel fuel which is far more polluting.
I would request that you analyze both the increased cost PSCAA created for the LNG Plant and TOTE's conversion to LNG when you required an SEIS so late in the process. Specifically, I would like you to analyze the net impact of increased Sox, Nox, particulate matter and CO2 emissions during the 18+ month delay due to the lack of timely action of PSCAA in the original Environmental Impact Statement. It is appropriate that you quantify the impacts the PSCAA actually had on air quality in the region due to your management of the original EIS.

Thank you for your consideration.

Brian Haynes

1841-1 10. LCA Calculations
1841-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: DJ Heffernan
To: Public Comment
Subject: Tacoma LNG Terminal
Date: Monday, October 29, 2018 9:49:11 AM

Hello - I am writing to express my opposition to the proposed Puget Soon energy LNG Terminal at the Port of Tacoma. We don't need an export terminal in Puget Sound for British Columbia gas. Let the Canadian's figure that out for themselves. The draft SEIS for the project is not complete and contains at least 10 “placeholder” values instead of actual data. One of these is related to the Global Warming Potential (GWP) value for methane. The project itself is proposed to be located on disputed Puyallup Tribal lands and is being built without their consent. I believe that the PSCAA should complete the draft SEIS and address these and other issues relating the the project's potential impact on global climate change. In particular the analysis should assess both 20 year and 100 year impacts, especially in view of the Intergovernmental Panel on Climate Change report that establishes the need for urgent action to reduce carbon emissions in the next two decades. Then the PSCAA should re-issue the SEIS, and reset the public comment period.

Sincerely,
--
Daniel J Heffernan
2525 NE Halsey Street
Portland, OR 97232
(503) 310-2306

1733-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 9:50:53 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Decarbonize washington!

Sincerely,

Gregory Heller
politics@gregoryheller.com
98102

2188-1 22. General Opposition

From: jlhelmbold@everyactioncustom.com on behalf of Joann Helmbold
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 12:41:06 PM

Dear Responsible Official,

Stop putting your profits above the environmental and health concerns!

Sincerely,
Joann Helmbold
Vassar, MI 48768
jlhelmbold@tds.net

1575-1 22. General Opposition
1575-2 3. Outside of SEIS Scope

From: Bon
To: Public Comment
Subject: LNG - We need more studies!
Date: Tuesday, November 20, 2018 4:57:12 PM

I attended the hearing at the Rialto. While I didn't come up to speak (and there were still many there to talk from the early session before anybody from the evening group spoke) I still was impressed with all of the information and passion coming from our community. I think the anti-LNG group had double the speakers which to me is an indication that people want more of an environmental scoping process. I don't understand the pro-LNG people. Why are they afraid of more study and information? If they are convinced it's going to be so great, fine. Let's find out so that everybody will know. There were just too many valid questions people had that could not be answered.

Please put me down for at least having more of a study about this. Seems like we should take more time when we are putting up a huge structure (that could be a problem) that will be here in Tacoma forever. Once we complete this, it will be ours.

By the way, I have a very close friend who actually works on LNG facilities in Fort MacMurry, Alberta. That is ground zero for fracking. When he learned about this LNG tank his comment was "Why the hell are they putting this thing so close to a city? That is not wise." I agree.

Please do more study on this. Please, for all of us.

Thanks for your time,
Bon Henderson
Tacoma, WA

2469-1 22. General Opposition



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Andrew Age 8/9

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

2227-2 22. General Opposition
2227-2 5. Regulatory Framework
2227-3 3. Outside of SEIS Scope

From: Janet Hendrickson
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, October 30, 2018 7:11:17 PM

Puget Sound Clean Air Agency,

Dear PSCAA,

I am deeply concerned about the LNG project, beginning with the fact that it has been allowed to get this far in construction without having the proper permits. That in itself should be a red flag that those behind the project are not interested in the well-being of our community.

Climate change is an immediate, overwhelming danger, and using natural gas contributes to the problem, from fracking, to the possibilities of leakage and spills along the pipeline. We need to be investing our resources in clean, renewable energy, not continue to build more fossil fuel sites.

I am also angry about the fact that facility is being built against the wishes of the Puyallup tribe, which should have sovereignty in this matter.

There is nothing about this project which advances the good of our communities. It only increases the dangers. Please deny the final permit for this project and then help ensure it is shut down entirely!

Thank you,

Janet Hendrickson
Seattle, WA

Janet Hendrickson
jsabrina@earthlink.net
14330 12th Ave NE, Apt 104M
Seattle, Washington 98125

1678-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:30:09 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Do NOT allow fracked gas in this area. It is horribly destructive to humans, animals, and the environment!

Sincerely,

Tristan Hendrickson
faeolanerhue@yahoo.com
98584

1597-1 22. General Opposition

From: Wren Hendrickson
To: Public Comment
Subject: No Fracked Gas in Tacoma!
Date: Monday, October 15, 2018 10:57:29 AM

I am absolutely opposed to building this in the Pacific Northwest! The fact that it is being built on tribal lands should have made it a non starter as the tribal community is against it. The environmental imact makes it unconscionable.

Do not allow this.

Miss Tristan Hendrickson
Registered voter and teacher
Shelton, WA

Sent from Yahoo Mail on Android

2197-1 3. Outside of SEIS Scope

From: doug43henry@everyactioncustom.com on behalf of Doug Henry
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Monday, October 22, 2018 4:30:04 AM

Dear Responsible Official,

In order to keep the earth habitable for humans, we must stop building new fossil fuel infrastructure. We should have a Manhattan Project level effort to switch to renewable energy ASAP.

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

Sincerely,
Doug Henry
Hull, MA 02045
doug43henry@verizon.net

1843-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Emily Herbert
To: Public Comment
Subject: Tacoma LNG Terminal
Date: Friday, October 19, 2018 10:11:18 AM

Dear Deciders:
In view of the latest IPCC report indicating that we have very little time left to dramatically reduce the existing CO2 in our atmosphere and have not reduced it at all in the past 30 years! It is imperative that we halt all non essential mining, transport and use of fossil fuels. This project is dirty, supports the worst harm from fracking which leaks methane as well as the life cycle of what is fracked. And they did not use the best available science for the Global Warming Potential (GWP) value for methane.
GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil. As a specie, we face enough dirty air to destroy all humans and much of life on the planet. STOP it NOW, please.
Emily Herbert
2120 NE Halsey #29
Portland OR 97232

--
"A dream you dream alone is only a dream. A dream you dream together is reality."
~ John Lennon

From: Kathleen Hewitt
To: Public Comment
Subject: Public Comment on SEIS
Date: Tuesday, November 20, 2018 10:28:05 AM

This is from my grandchildren who live in Tacoma. Both of my grandsons decided to request you honor the Puyallup tribe's treaty. Both drew something extra on their page, all on their own: Owen (left) drew a stack showing toxic emissions he does not want to breathe. Drew (right), although you can't see it very well is aware of the impact of money and what it can do to his health. He drew a dollar bill with the "no" sign over it.

Please listen to the youth. It really is their future at stake and they are well aware of it.

Sincerely,
Kathy Hewitt



1751-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1751-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 11:28:19 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I'd like to concentrate on one of many concerns I have in the draft SEIS and that is the process in analyzing the GWP. The GWP number given in the report is 25 for a 100-year period. This is from the UN IPCC AR 4 report. There is now an AR5 report showing methane's GWP at 28 tons. I've seen other more current reports showing methane's GWP higher than either one of these. A 100-year analysis does not fit with the methane emissions characteristics. A more accurate analysis would be to include a 20 year study for 2 reasons: one, that methane's emissions are short lived, about 10 years and, two, the IPCC's special report on the rapid response needed to limit global warming to 1.5 C above pre-industrial levels.

From the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), approved in 2009, I recently read the following statement on using the 100 yr GWP horizon:

"The GWP has become the default metric for transferring emissions of different gases to a common scale; often called 'CO2 equivalent emissions' (eg., Shine, 2009). It has usually been integrated over 20, 100 or 500 years consistent with Houghton et al. (1990). Note, however that Houghton et al. presented these time horizons as 'candidates for discussion [that] should not be considered as having any special significance'. The GWP for a time horizon of 100 years was later adopted as a metric to implement the multi-gas approach embedded in the United Nations Framework Convention on Climate Change (UNFCCC) and made operational in the 1997 Kyoto Protocol. The choice of time horizon has a strong effect on the GWP values – and thus also on the calculated contributions of CO2 equivalent emission by component, sector or nation. There is no scientific argument for selecting 100 years compared with other choices (Fuglestvedt et al., 2003; Shine, 2009). The choice of time horizon is a value judgment because it depends on the relative weight assigned to effects at different times."

Based on the above statement, it seems to me that using the 100 year horizon for methane's GWP would skew the emissions numbers because of the short lived emission characteristic in methane compared to the long lived emissions in CO2. In layman's terms, it feels like comparing apples to oranges. I have read about recent recommendation to use a dual term GWP of 20 and 100 years. A co-author on this subject I found on the internet, Michael Oppenheimer, the Albert G. Milbank Professor of Geosciences and International Affairs at Princeton University says, "Different gases have widely different lifetimes in the atmosphere after emission and affect the climate in different ways over widely different timescales. The paired approach creates a more comprehensive picture of the nature of climate change and the effects of various policies to stem its consequences." Lead author Ilissa B. Ocko from the Environment Defense Fund said in that same article, "It is imperative that both the near-and long-term climate impacts of policies be transparent to a decision-maker. We are not saying that one timescale is more important than the other, just that the decision-maker must be fully informed of climate impacts on all timescales."

In conclusion, I'm asking you to please consider using the most recent data in GWP emissions for methane and add the GWP data for a 20 year factor so that we can receive a more thorough analysis. Also, know that I support the Puyallup tribe with their stance on the subject of the LNG plant.

Thank you for this time.

Resources:
https://www.npr.org/2018/10/08/655360909/grim-forecast-from-u-n-on-global-climate-change
phys.org/news/2017-05-current-climate-mask-trade-offs-policy.html - jCp
www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values %28Feb 16 2016%29_1.pdf

Sincerely,

Kathleen Hewitt
katmh@comcast.net
98407

Steve: Yeah, it's right here. So, Desiree Douglass? kathy Hewitt?

Kathy: Good evening. My name is Kathy Hewitt, and I'm a resident of Tacoma. I'm a grandmother to two wonderful boys, and that's the main reason I'm here. Today, I'd like to concentrate on one of the many concerns I have in the report, the process in analyzing the GWP. The GWP number used in the report is outdated. One study published less than a year ago even suggests that the GWP for methane is likely 14% more than the AR5 number. In addition, a more accurate analysis would include a 20 year study for two reasons.

[04:31:00] 1) That methane's emissions are short lived. And 2) the IPCC's special report on the rapid response needed to limit global warming. The AR5 report states, "The choice of time horizon has a strong effect on the GWP values. And thus, also on the calculated contributions of CO_2 equivalent emissions by component, sector, or nation. There is no scientific argument for selecting 100 years compared with the other choices. The choice of time horizon is a value judgment because it depends on the relative weight assigned to affects at different times."

Some scientists are supporting the concept of using both the 20 and 100 year numbers. In one article I read, Princeton University professor Michael Oppenheimer said, "Different gases have widely different lifetimes in the atmosphere after emission and affect the climate in different ways over widely different time scales."

[04:32:06] "The paired approach creates a more comprehensive picture of the nature of climate change and the affects of various policies to stem its consequences." In that same article, Alissa B. Occo of the Environmental Defense Fund said, "It is imperative that both the near and long term climate impacts of policies be transparent to a decision maker. We are not saying that one time scale is more important than the other. Just that the decision maker must be fully informed of climate impacts on all time scales."

In conclusion, please use the most recent scientific data for GWP units and apply a 20 year horizon for the GWP, so that we can receive a more thorough, accurate analysis. Thank you for your time.

1167-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1167-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

1347-1 22. General Opposition

From: Rachel Hibbard
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 10:51:28 AM

Name: Rachel Hibbard
Email: dirh@pdx.edu
Address: 3139 Nw Vaughn Portland Oregon -
Portland Oregon, Oregon 97210

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Hello And thank you for the opportunity to comment on this project
There's no time to lose in turning around our economy from fossil fuel to renewable energy.
We must invest in our future instead of Bearing ourselves in the past.

0365-2 3. Outside of SEIS Scope
0365-2 22. General Opposition
0365-3 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Elaine Hickman

Address or email 520 N. 120th St. Seattle WA 98133

I am strongly opposed to this project because it violates the Puyallup Tribes treaty rights under the 1855 Medicine Creek Treaty. Treaty rights have more authority than the right of any other governing body or agency. Why have their rights been ignored and their land and people subject to such risk? They must be included in any negotiations to move forward with this project, regardless of how difficult or inconvenient it is to accomplish.

From: Janet Higbee-Robinson
To: Public Comment
Subject: Draft Supplemental Environmental Impact Statement
Date: Thursday, November 1, 2018 3:47:19 PM
Attachments: Draft Supplemental Enviro Impact.pages

Nov. 1, 2018.

Hello.

The current draft of the SEIS is woefully inadequate and misleading, as informed community members made clear to you at the hearing on Tuesday, October 30. Do the right thing and begin all over again with your review of the LNG Plant's impact on our air quality. No doubt, a properly conducted review, based on up to date science, will reveal that transport, containment and export of fracked gas will threaten our air quality to a devastating degree. Methane will not only dirty our air but contribute to accelerated climate change. Just at a time when the planet is reaching its tipping point in regards to human carelessness. Duh! Do your job! Protect Chief Leschi School students, the Puyallup Tribe, Fife community members, Northeast and Hilltop residents, workers at the Port and my small grandson. His little lungs cannot bear this assault and his future smells stinky and poisonous!

Janet Higbee-Robinson

2531-1 3. Outside of SEIS Scope
2531-2 3. Outside of SEIS Scope

Steve: Thank you. So, next is Rus Higley.

Rus: Thank you for letting me speak today during the public comment period for the SEIS, for the Puget Sound Energy Liquid Natural Gas Plant in Tacoma.

[05:24:00] My name is Rus Higley. And with my wife and two children, I live in Tacoma and work in the Puget Sound region. I am a marine biologist and teach in the sciences at several local colleges, including the nearby University of Washington Tacoma. In fact, the students in my science and sustainability class are here today listening in and being part of our future. According to Puget Sound Clean Air Agency's own strategic plan, 2014 to 2020, your agency has two goals. And I quote, "protect public health and the environment from air pollution and become the most climate friendly region in the United States."

Within that document, you discuss targeting "high impacted communities where pollution levels pose the greatest risk" and "socioeconomic disparities in air pollution". Tacoma and its aroma have been the butt of jokes in this region, in terms of air quality and pollution for half a century due to a legacy of pollution that still lingers and still significantly impacts the citizens that live in the region surrounding the Port of Tacoma.

[05:25:02] Although the pollution directly coming out of a tail pipe will significantly decrease, when switching from bunker fuel and diesel, this ignores the real cost, due to the others paying the upstream and downstream environmental costs of natural gas and results in a net loss. You must account for the full lifecycle of natural gas. If we are concerned about air quality in Tacoma, TOTE Shipping has already answered with their ability to turn off the ships and plug into shored power.

If Puget Sound Clean Air Agency is to reach its second goal of "becoming the most climate friendly region in the United States", it must not be at the cost of damaging other locations. To adequately measure this, the SEIS must include the most current research on natural gas, especially including fugitive emissions and the most recent numbers that show natural gas is likely equivalent to coal in global warming potential. Whether referring to natural gas or liquid natural gas, neither are the answer.

[05:26:00] Tacoma is not the pig, and it doesn't need anymore lipstick.

Steve: Thank you. Next up is Linda Fortune.

[05:08:00] Stephanie Hillman?

Stephanie: Thank you. My name is Stephanie Hillman. I'm a campaign rep with the Sierra Club. And we incorporate, by reference, the comments of the Puyallup Tribe and definitely strongly support their concerns. I also support the well thought out comments of those who have spoke before me, community members who oppose this project. We, the Sierra Club, will be submitting some more technical comments. But I wanted to take this chance to thank you for conducting the SEIS and for holding this hearing because I want to trust that this means you're taking the greenhouse gas emissions of fracked gas and its impacts on climate change very seriously.

With the IPCC conclusion that we have 12 short years to turn this whole fossil fuel impact around, I hope you realize that this is an opportunity for you to be a part of the solution and not a key player in bringing on the most catastrophic impacts of climate change.

[05:09:12] And you've heard from so many people here tonight that have read and analyzed the SEIS and have heard that, and I agree, that it grossly underrepresents the true impacts of fracked gas on our climate and, therefore, the true impacts of this particular LNG facility. I urge you to apply the best available science and a new assessment and see if your conscience allows you to permit a project that would so negatively impact the future forever. Thank you.

Steve: Thank you. Before I call the next speaker up, the next group of five will include Tom Pearson, Terry Velasquez, Chuck Valdez, Russ Higley, Molly Frankel, and Malcolm Russel.

1218-2 22. General Opposition
1218-2 3. Outside of SEIS Scope

2561-1 3. Outside of SEIS Scope
2561-2 10. LCA Calculations
2561-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Linda Hiser
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, October 30, 2018 9:12:31 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,
Personal Note:
My son lives up the hill from the Tideflats. An LNG storage plant will be exceedingly dangerous. California positioned their LNG storage facility close to shipping but far away from commercial or residential areas near Santa Barbara. It was the recommendation by the EIS report that LNG storage Must be a great distance away from citizens. Explosions can occur. Methane gas is released during the process of cooling. Earthquakes or storms can shut off power. Even a slight warming due to loss of power can cause an explosion. How do I know of the CA EIS report recommendations? My brother's company did the EIS report twenty years ago.
LNG is not safe for our environment. LNG storage was too costly of a venture for British Columbia, why is Tacoma proposing this fool's folly?
We will fight this for my family, and for the safety of families living in the area. LNG is a short term fix; it is not the future.

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year

GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Linda Hiser
lindajhiser@gmail.com
151 Island blvd
Fox Island , Washington 98333

2561-3 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
2561-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2561-5 19. LCA Inputs and Assumptions - End Use
2561-6 14. LCA Inputs and Assumptions - Leakage/Slippage
2561-7 13. LCA Inputs and Assumptions - Natural Gas Source
2561-8 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Joseph Hiss
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 6:43:42 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.

My experience as a fish and wildlife biologist for 32 years, followed by 10 years as a volunteer environmental educator, has convinced me that we must not allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources. The current SEIS has 6 defects that must be remedied:

1. The SEIS uses the 100-year potential effect of methane, not the 20-YEAR value which is much more relevant given the half-life of methane. The appropriate 20-year value use is 96.

2. This facility is projected to have a 40 year lifespan, but as I understand it the world has only about 12 YEARS to act decisively. It is unrealistic for the report to promise reducing air pollution 100 years from now!

3. The SEIS claims emissions benefits from customers that PSE has NOT SECURED. The only maritime customer has only two vessels, which have already delayed their conversion to LNG.

4. The SEIS says that emissions will only be reduced if the natural gas comes from Canada, but recent studies have shown that LEAKAGE RATES are much worse than those given in the SEIS.

5. How can it be guaranteed that PSE is sourcing its gas from BC? Their recent filings show they also relied on gas Alberta and the US. And with the recent explosion in BC that interrupted PSE's supply, we know that this SOURCE WILL NOT ALWAYS BE AVAILABLE.

6. When ships burn fuel, some slips, without burning, into the atmosphere. The SEIS uses a LOWER SLIPPAGE RATE than is considered best practice.

I hope you will revise your assessment of these issues when redrafting this SEIS.

Joseph Hiss
joe.hiss.biologist@gmail.com
225 17th. Ave. SE
Olympia, Washington 98501-2238

2562-1 22. General Opposition
2562-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2562-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2562-4 19. LCA Inputs and Assumptions - End Use
2562-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2562-6 13. LCA Inputs and Assumptions - Natural Gas Source
2562-7 14. LCA Inputs and Assumptions - Leakage/Slippage

1479-1 22. General Opposition

From: Robert Hodge Hodge
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:36:52 PM

Name: Robert Hodge Hodge
Email: rhodge4477@msn.com
Address: 3735 NE Cleveland Ave -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I am against any form of FRACKING!! NO NO NO!!!

Steve: Next up is Alex Hofeling.

[04:55:00]

Alex: Good evening PSCAA staff and all concerned citizens within this room. My name is Alex Hofeling. I live in Gig Harbor with my family. I'm also a TOTE employee. I'd like to start with a statement we can all agree on. Environmentally, we need to do better. Status quo is no longer acceptable. And I think everybody in this room has illustrated that. As a matter of fact, the Obama led EPA created a mandate to make such improvements. This mandate were for shipping companies, such as TOTE, operating within 200 miles of the United States, to make great improvements to improve local air quality.

TOTE made the decisions and the investment to make the greatest improvement by removing most of all sulfur from our fuel. Comparing this choice against the status quo, TOTE burns diesel to power our ships today.

[04:56:00] The reality is this. We either stay with the status quo, diesel, or we can advance to something better. There is no false third choice. In this case, our something better is a fuel source that provides better local air quality and, according to the SEIS, reduced greenhouse gases based on science, not on words. And 100% were significant reductions in sulfur, significant reductions in particulate matter, and as I noted, about 14% reduction in greenhouse gases through our ships. This is getting better in increments. Or the choice is do we stay with the status quo. These are the two choices. There is no third choice.

If TOTE cannot get access to this fuel, we, in essence, all of us, in reality, accept the status quo. That's the reality. That's worse air quality in Tacoma, which is a huge point for the PSCAA.

[04:57:00] It's also worse air quality in Puget Sound and Alaska. It's also, according to the SEIS, increased greenhouse gases. We need to do better, and we can do better. If we don't accept the environmentally improving technologies, we are accepting status quo. I urge PSCAA to follow the science and follow your rule improving air quality. Thank you very much.

1254-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1254-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Steven Hofer
To: Public Comment
Subject: Re-run the Tacoma LNG SEIS with updated methane GWP value
Date: Wednesday, November 21, 2018 6:24:49 PM
Attachments: image.png

November 21, 2018

Steven Hofer
Burien, WA 98168
steven.p.hofer@gmail.com

Puget Sound Clean Air agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 3rd Ave. Suite 105
Seattle, WA 98101

I want to thank the hard-working folks at the PSCAA for their in-depth FEIS and SEIS reports they did on the Tacoma LNG plant. Now I am asking the PSCAA to supplement their SEIS with a **Global Warming Potential** of methane from reports that are more recent than the 2006 report used in the SEIS.

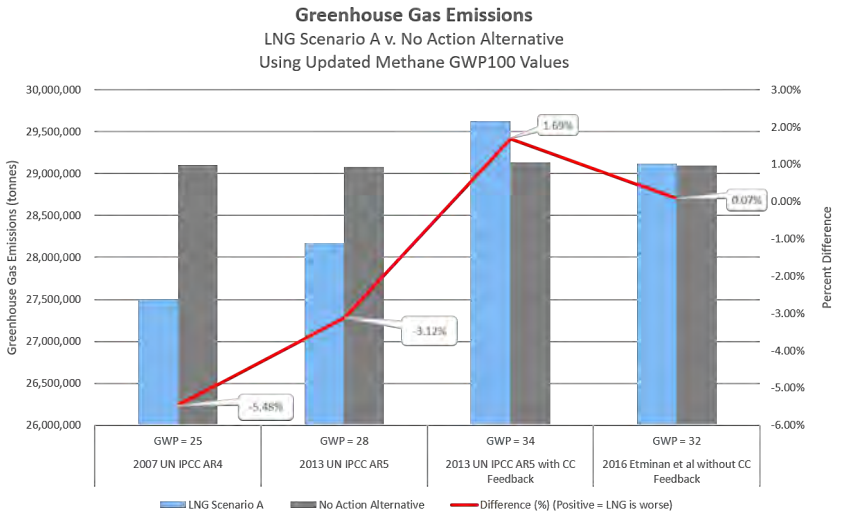
Methane Global Warming Potential over 100 years:
2007 UN IPCC AR4 (used by PSCAA).....25 tons CO2 equivalent
2013 UN IPCC AR5 (without climate carbon feedbacks .....28 tons CO2 equivalent
2013 UN IPCC AR5 (with climate carbon feedbacks).....34 tons CO2 equivalent
2016 study by M. EtminanG. MyhreE. J. HighwoodK. P. Shine.....32 tons CO2 equivalen**t**

I work as an engineer for a Navy contractor designing and ruggedizing circuit boards to a vast library of MIL-STD specifications and test procedures. So I have some idea the resources it takes to conduct a study and write a report of this magnitude.

When my colleagues and I have to synthesize large volumes of data, pictures, and analyses, we invariably end up building customized tools that are specific to the project. Spreadsheets with complex data-manipulation formulas, tools for retrieving large data sets, interfacing with test equipment and so forth. In reviewing the SEIS, I was keenly aware of the large amounts of data and analysis that went into the pictures, charts, paragraphs, and maps.

My point here is: the authors and contributors of the FEIS and SEIS at PSCAA have built the tools that made the reports possible. **Those tools can be used again (without re-incurring the cost of developing them from scratch). Re-run the models again, feed them the more recent Global Warming Potential values from the 2013 UN report and 2016 UN report. Then report these findings alongside the findings you're currently reporting with the 2007 GWP value.**

Your results should look something like this chart, construction of which can be found here.



Regards,
Steven Hofer
BSEE, Univ. of WA
steven.p.hofer@gmail.com

1439-1 22. General Opposition

From: Louise Hoff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 6:02:48 PM

Name: Louise Hoff
Email: louisehoff2@gmail.com
Address: 9240 Se Taylor St -
PORTLAND, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puyallup Tribe does not want you to foul their land with fracking acids.
Fracking uses far too much clean water and injects acids into the land.
Fracking is the opposite of what we need to do the address an environmental disaster.
No fracking in Tacoma!

1531-1 22. General Opposition

From: Louise Hoff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 6:28:09 PM

Name: Louise Hoff
Email: louisehoff2@gmail.com
Address: 9240 Se Taylor St -
PORTLAND, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Fracking and exporting fuel to china is not in the interest of protecting the planet and allowing our youth to have a full life on a habitable planet.

[00:31:00]

Carole: Thank you. Steve Hoffman? I'm sorry, this is Steve Hoffman@ Earthlink.net.

Steve: Yeah, that's me. My name is Steve Hoffman, and I am speaking on behalf of the Freedom Socialist Party. As my party's candidate for US senate in this year's primary, I was proud to stand with the Puyallup tribe and area activists in their fight to stop the Tacoma LNG facility. It is outrageous that a private energy firm would be allowed to build such a high risk facility so close to a population center, and without anything resembling proper consultation with the Puyallup Tribe as required by treaty and so clearly explained by the representative from the Puyallup Tribal Council today. The LNG facility poses a grave danger to the tribe's fish runs that they rely on.

[00:32:00] Tribal fish rights should mean that the government is responsible for doing whatever it takes to make sure that there are fish in the waters. Washington State has no right to put those fish and the health of Puget Sound at risk, so a fossil fuel corporation can obtain a permit. Given that the recent UN report on climate change has warned that we only have 12 years to dramatically reduce the burning of fossil fuels to avoid ecological catastrophe, now is not the time to double down on fracked gas. As other speakers have mentioned, the fracking process itself poisons water aquifers, ruins lands.
And from the production, distribution, storage, and transmission, produces high greenhouse gas emissions. Today, I urge the Puget Sound Clean Air Agency to take a stand for a health planet and a sustainable energy future.

[00:33:00] And as far as the jobs go, I think the construction of a sustainable energy infrastructure throughout the nation would provide far more jobs than the fossil fuel projects that we're discussing today. I urge you to deny the permit for the LNG facility. Thank you.

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about treaty rights of the Puyallup people and other indigenous groups. Please include the wishes of tribes in all areas which may at all be impacted by any infrastructure + emissions in your FSEIS.

thanks

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hogan	Email:
Address: 8003 44th AVE NE Seattle	Phone:

0584-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

As a parent of 2 kids I'm completely confused about how fracked gas has become any sort of energy solution with the threats to our communities health. I can't imagine a state where a family choosing to walk forestland or down a street could risk exposure to the toxic soup used to extract the gas. Carcinogens not only at the source of tailing ponds but all along the pipeline + transport routes. Please use your heart when making preparing the additional info in the FSEIS. Protect our kids! Thanks!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hogan	Email:
Address: 8003 44th AVE NE Seattle	Phone:

0585-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I'm grossed out and shocked knowing that tailing ponds are even real. Please study the psychological state of the people who design + pay for these. The psychological profiles of those who dump the sludge, slurry + toxic waste for generations to come - for the sickness it will bring to so many now + in the future. Are they themselves sick? Are they so disconnected from love of life on this planet that they just don't care or perhaps it is a self-destructive or sociopathic profile. Please study this or have it studied.

Please include this impact in the Final Supplemental Environmental Impact Statement. Thanks!!

Name: Rachael Hogan	Email:
Address: 3003 44th AVE NE Seattle	Phone:

0586-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Just because people may not live near extration points, other living beings do. I'm very concerned about the ~~exposure~~ levels of toxic chemicals used for extration with clean water. Please study what kinds of life can live in the waters that has been used for gas extraction. This will be whats left of us if money continue to driven energy decisons.

Thanks!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hagan	Email:
Address: 8003 44th AVE NE Seattle WA	Phone:

Carole: Thank you. Rachel Hogan?

Rachel: Hi, thanks for hearing me. I saw the effects of a toxic spill when I was a fisherman. I saw oil deposits from Exxon Valdez oil spill back in the late '80s spread far and hundreds of miles away from where it happened and with huge and lasting impacts to fisheries, jobs, beaches, and not the least of which was the toll it took upon the animals, the sea life, the birds, and mammals.

[02:37:07] I won't forget it. Years later, it was hard to sample herring without getting piles of lesioned fish. They have big, angry, open wounds ulcerated, dying tissue. And when you witness fish swimming in circles not because they're playing or because they're chasing prey but because their bodies are permanently bent, and they can't swim right, you quickly understand how toxicity lasts in the chain of life for generations. When I later worked in a small place poisoned by industry, I experienced just a tiny bit of the horror of how that manifests. The people who made profits from an extractive industry were long, long gone.

But the people who lived there were left with the faulty water filtration system, which produced liquid that wasn't even fit for the dump. EPA oversight meant that someone came to change the filter once in a while, sometimes with years in between.

[02:38:00] So, people had babies born with birth defects. Parents and kids struggled to think. Dogs were sick and squirting from both ends. And I could go on. Until some of you have experienced this first hand, or unless you already live in Tacoma and know what's going on, this may be some far off idea that you believe won't really affect you. But I'm here tonight to tell you it's not just some emotional version of sad and unfortunate. It's very cruel and very real. This happens over and over, until we are where we are now.

With Puget Sound posed to operate that huge tank, building it like it owns the place and belongs, like a lesion sitting there already eating away at the living earth and desiring to spread its twisted veins across our lands and into the air, accelerating climate change with methane. We need to get it off Puyallup Tribal Fishing grounds now.

[02:39:00] Saib Tabrizi says, "When poison becomes a habit, it ceases to injure, make your soul gradually acquainted with death." Off Ecology's website, the state environmental SEPA policy has some

great ideas. I'm out of time. I'm going to say there are poisons that blind you and poisons that open your eyes. Mine are open. I hope that the poisons around you don't blind you.

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2130-1 3. Outside of SEIS Scope

Just because people may not live near extration points, other living beings do. I'm very concerned about the ~~exposure~~ levels of toxic chemicals used for extration with clean water. Please study what kinds of life can live in the water that has been used for gas extraction. This will be whats left of us if money continue to drives energy decisons.

Thanks!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hogan	Email:
Address: 8003 44th AVE NE Seattle WA	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2131-1 3. Outside of SEIS Scope

I'm grossed out and shocked knowing that tailing ponds are even real. Please study the psychological state of the people who design + pay for these. The psychological profiles of those who dump the sludge, slurry + toxic waste for generations to come - for the sickness it will bring to so many now + in the future. Are they themselves sick? Are they so disconnected from love of life on this planet that they just don't care or perhaps it is a self-destructive or sociopathic profile. Please study this or have it studied.

Please include this impact in the Final Supplemental Environmental Impact Statement. Thanks!!

Name: Rachael Hogan	Email:
Address: 3003 44th AVE NE Seattle	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2132-1 3. Outside of SEIS Scope

As a parent of 2 kids I'm completely confused about how fracked gas has become any sort of energy solution with the threats to our environment + health. I can't imagine a state where a family choosing to walk forestland or down a street could risk exposure to the toxic soup used to extract the gas. Carcinogens not only at the source of tailing ponds but all along the pipeline + transport routes. Please use your heart when making preparing the additional info in the FSEIS. Protect our kids! Thanks!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hogan	Email:
Address: 8003 44th AVE NE Seattle	Phone:

2134-1 5. Regulatory Framework

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am concerned about treaty rights of the Puyallup people and other indigenous groups. Please include the wishes of tribes in all areas which may or all be impacted by any infrastructure + emissions in your FSEIS.

thanks

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rachael Hogan	Email:
Address: 8003 44th AVE NE Seattle	Phone:

1897-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately ~~represent the true~~ greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

The dangers of an LNG facility in the tideflats area of Tacoma are unacceptable. Knowing what we know about the dangers of climate change this project is a step in the wrong direction for the health of our planet.

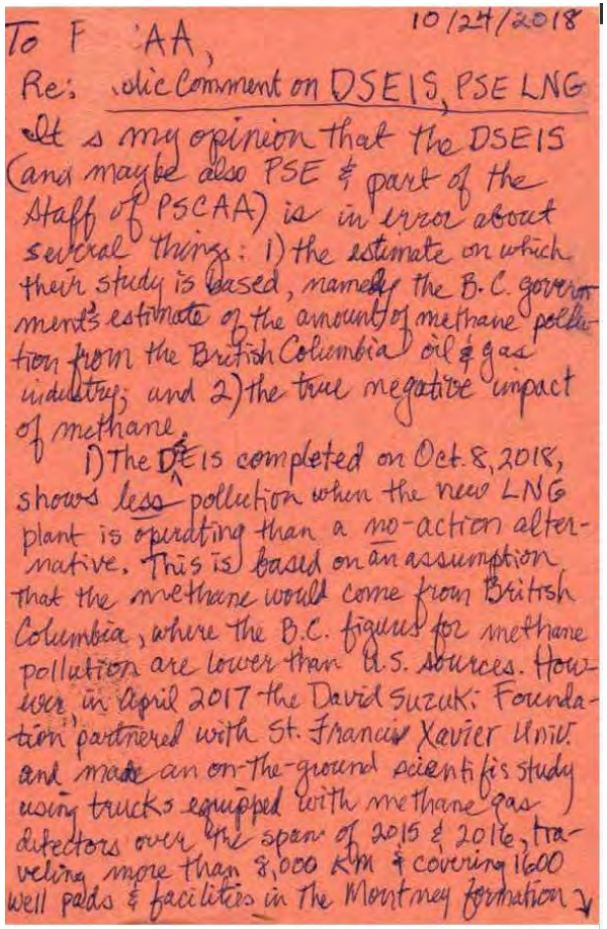
(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Jenny Holmes Email: jchrestore@gmail.com

Address: 2325 NE 44th Ave, Portland, OR 97213

By completing this comment card you agree to receive updates about the project.



To F AA, 10/24/2018

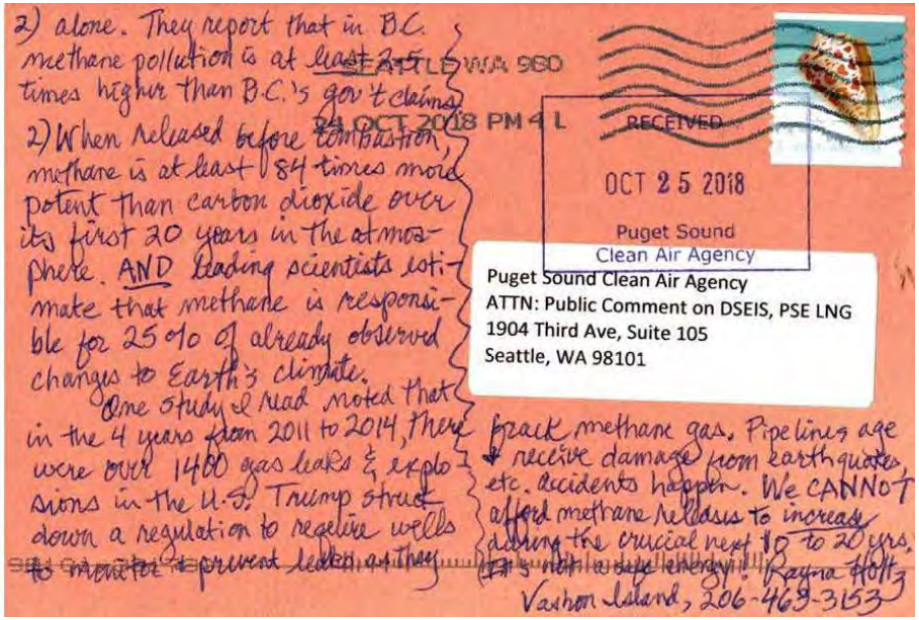
Re: olic Comment on DSEIS, PSE LNG

It is my opinion that the DSEIS (and maybe also PSE & part of the staff of PSCAA) is in error about several things: 1) the estimate on which their study is based, namely the B.C. government's estimate of the amount of methane pollution from the British Columbia oil & gas industry; and 2) the true negative impact of methane.

1) The DEIS completed on Oct. 8, 2018, shows less pollution when the new LNG plant is operating than a no-action alternative. This is based on an assumption that the methane would come from British Columbia, where the B.C. figures for methane pollution are lower than U.S. sources. However in April 2017 the David Suzuki Foundation partnered with St. Francis Xavier Univ. and made an on-the-ground scientific study using trucks equipped with methane gas detectors over the span of 2015 & 2016, traveling more than 8,000 KM & covering 1600 well pads & facilities in the Montney formation ↓

0307-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

0307-2 13. LCA Inputs and Assumptions - Natural Gas Source



2) alone. They report that in BC. methane pollution is at least 3.5 times higher than B.C.'s gov't claims.

2) When released before combustion, methane is at least 84 times more potent than carbon dioxide over its first 20 years in the atmosphere. AND leading scientists estimate that methane is responsible for 25% of already observed changes to Earth's climate.

One study I read noted that in the 4 years from 2011 to 2014, there were over 1400 gas leaks & explosions in the U.S. Trump struck down a regulation to require wells to monitor & prevent leaks, as they frack methane gas. Pipelines age & receive damage from earthquakes, etc. Accidents happen. We CANNOT afford methane releases to increase during the crucial next 10 to 20 yrs. It's not a safe energy!

Rayna Holtz
Vashon Island, 206-469-3153

SEATTLE WA 980
24 OCT 2018 PM 4 L
RECEIVED
OCT 25 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG
1904 Third Ave, Suite 105
Seattle, WA 98101

City of Tacoma
Puget Sound Clean Air Agency
Hearing on SEIS for Tacoma Liquefied Natural Gas Facility
October 30, 2018

To All Who Are Concerned:

My comments on this EIS center around three issues.

The first issue is that I find the approval process fatally flawed, in that both the Final EIS and now the Supplemental EIS have failed to secure permission from the Puyallup Tribe. The 1854 Treaty of Medicine Creek recognizes their ancient rights to hunt, fish and forage in their usual and accustomed areas in the Puyallup River/Commencement Bay shorelines for thousands of years before other peoples came to build the city of Tacoma. They oppose this LNG plant.

The second issue is that methane escapes and spills and powerfully increases the greenhouse effect. The life cycle analysis is based on the understanding that the source of the natural gas will be British Columbia. But a 2017 study by the David Suzuki Foundation in partnership with St. Francis Xavier University showed that "Methane pollution from the oil and gas industry in British Columbia is now at least 2.5 times higher than stated by the B.C. government, and may be much higher." Methane is 87 times more potent than carbon dioxide in a 20-year period. Currently B.C.'s new regulations have yet to be proven effective, while the United States has no regulations or enforcement adequate to control the escape of methane into the atmosphere, and to prevent spillage all along the line from extraction to transport along pipelines, to storage or conversion at an LNG plant, and finally delivery to customers. Attempts during the Obama administration to institute regulations were cancelled by the Trump administration.

Meanwhile, the International Panel on Climate Change issued a press release on October 8, 2018, comparing likely scenarios from limiting global warming to 1.5°C versus 2°C. In the first scenario, global sea level rise would ten cm lower than in the second, and coral reefs would decline by 70-90 percent compared to 99 percent in the second. The report states that "We are already seeing the consequences of 1° of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice." It also concludes that our efforts must accelerate.

It is folly to build yet another fossil fuel plant, when what the world desperately needs are new renewable and clean energy facilities. Even if there were no methane leaks, (but there are multiple ones at every stage of the gas life cycle), burning LNG still emits quantities of CO_2 into the atmosphere, where they add to the greenhouse effect. Wind and solar do not, and there are sites aplenty in

0444-1 5. Regulatory Framework
0444-2 13. LCA Inputs and Assumptions - Natural Gas Source
0444-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
0444-4 14. LCA Inputs and Assumptions - Leakage/Slippage
0444-5 3. Outside of SEIS Scope

Washington and neighboring states where both can thrive. In the face of fierce, deadly forest fires in California, Washington, and B.C. this summer, and of violent hurricanes decimating cities every year now, and some South Pacific Islanders already forced to abandon their inundated islands, and over half of the world's coral reefs dead already, we don't have time to fiddle with so-called "transition fuels." We need to make every effort to stop ALL emissions of greenhouse gases asap.

In the September 16 issue of *Seattle Times Pacific NW*, pp32-3, there's an article about the Seattle move toward green energy. The nonprofit Built Green, a program of the Master Builders Association of King and Snohomish Counties, notes that "Since 2008, the number of certified green homes in Seattle has increased, and those homes are going for higher levels of certification. " In 2014 Built Green certified 33 percent of newly permitted single-family homes, in 2017 it was 65 percent, and on August 22 this year the numbers already exceeded the entire year of 2015. Green Canopy Homes builds exclusively net-zero-energy homes. One person interviewed noted that "Millenials are far more interested (than prior generations) in purchasing products and services from organizations aligned with their values rather than just getting the best price to consume the most." There are similar movements on Vashon Island and other places.

My third issue is safety. Mount Rainier was recently listed as the second most dangerous volcano in the U.S., and the path of its mud flows during eruptions in the past has been through Puyallup into Commencement Bay. The tide flats location is also subject to sea level rise and to earthquakes. An eruption could coincide with earthquake activity and generate a tsunami as well. Geologists studied the developments at Mount Saint Helens avidly for months before the eruption, yet nobody was expecting the side to blow out of the mountain. Geologist David Johnson barely had time to shout a warning over his transmitter before he was obliterated. More and more, as our climate deteriorates, we are learning not to count on the old patterns.

At its best, the PSE LNG plant will increase global warming. But at its worst, in the current regulatory climate, and without monitoring or enforcement, it will increase it on steroids.

Sincerely,

Rayna Holtz

Rayna Holtz

0444-6 3. Outside of SEIS Scope
0444-7 3. Outside of SEIS Scope

Steve: Thank you. Carol Umbehocker? Rayna Holtz?

Rayna: Thank you for the opportunity to comment. I'll try to be brief.

[05:37:00] I submitted by printed statement. And I think I am going to just wing it because there are some things that really haven't come up, I feel. I think that we have looked too narrowly at the impact of the lifecycle of natural gas. I feel as though to look simply at how natural gas compares to oil and diesel is the wrong comparison. That we have to look at all of the issues, in the context of the health of our ecosystem and our climate. And that all three of them are no longer safe for us. That, essentially, the IPCC new estimates of how rapidly climate change is happening changes all of the basic rules of the game.

[05:38:13] It's very difficult to understand all of the issues that are involved. But for one thing, it's not just the life history of the gas, once it's fracked. It's what the contamination is that's left behind, in extracting the fuel that we need to live the way we currently live. And we know now that we can't continue to live the way we have been living. And we have to look at the contaminants that are a part of fracking and realize that those contaminants are going to be around for hundreds of years. They are contaminating the soils and the waters. And moreover, the climate change is not going to just be temporary inconvenience.

[05:39:05] It's beyond anything that we've yet experienced. And we've been experiencing once a year disasters every single year now for the past 10 years, I think. The unbelievable forest fires, the unbelievable hurricane damage, the flooding. And as a result, we're going to have to stop saying we only have two alternatives and look for an alternative that's a clean one. Thank you.

Steve: Thank you. So, I'm going to go through the list of the next names I'll call, and I'll come back to the first one on the list. Joanna Monroe, Shirley Low, Marianna B, Tara Doyle-Ennekin, Dan Riley, Joy Caddock, Zoe Shurman, John Winkler, Sarai Salgado, Twylia Westling.

1206

1206-1 3. Outside of SEIS Scope

1319-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1319-2 13. LCA Inputs and Assumptions - Natural Gas Source
1319-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1319-4 3. Outside of SEIS Scope

From: h
To: Public Comment
Subject: SEIS for Puget Sound Energy Liquid Natural Gas Plant
Date: Thursday, November 15, 2018 6:41:51 PM
Attachments: Puget Sound Energy Liquid Natural Gas Plant SEIS.docx

Puget Sound Energy Liquid Natural Gas Plant
Comment on SEIS from Rayna Holtz

The October 2018 SEIS errs in its estimates of the harmful greenhouse gas effects of the methane Puget Sound Energy proposes to purchase and transport to its LNG site in Tacoma. I want to address three areas where the report is inaccurate and/or inadequate.

First, it is a mistake to calculate the Global Warming Potential (GWP) for a period of 100 years. Because methane is 86 times more potent than CO_2 during the first 20 years after it escapes into the atmosphere, and it then dissipates into CO_2 and water vapor (which continue to act as greenhouse gases[1]), and because it is precisely the next 20 years in which we seek to significantly reduce our greenhouse gas emissions, we need to focus our planning and preparation to avoid all possible additional contributions during this next 20 years. At current rates of emissions we are pushing global climate change past tipping points that lock us into worsening feedback loops.

Second, the EIS uses faulty estimates of how much methane escapes into the atmosphere at well sites, during transportation in pipelines, and at junctions where the gas is transferred or delivered as part of processing and use at destinations. Authors of the EIS used inadequately researched figures for the British Columbia sources they target for the majority of the methane they plan to purchase. These figures are very likely incorrect, in light of the ground-based measurements undertaken in 2015 and 2016 that found, “Methane pollution from the oil and gas industry in British Columbia is now at least 2.5 times higher than stated by the B.C. government, and may be much higher.” This research was conducted by the David Suzuki Foundation in partnership with St. Francis Xavier University[2]. Reports from their 2018 research find that 85 percent of active wells are directly venting methane daily and that B.C. methane emissions continue to be 2.5 times higher than reported.[3]

Likewise, other current climate change studies continue to corroborate the conclusion of a study conducted in 2014 by Stanford University, the Massachusetts Institute of Technology and the Department of Energy’s National Renewable Energy Laboratory, which shows that “Methane leaks negate the benefits of natural gas as a fuel for vehicles”.[4] There is not adequate monitoring of accidental emissions throughout the life cycle of methane gas, beginning with fracking sites, and including also the abandoned wells and wellfields.

The United States government currently does not adequately protect citizens from the plethora of negative impacts to water, soil, air, oceans, ecosystems, and human health from methane gas mining and emissions. We depend on our state and local agencies to examine closely the current research, and recognize that all greenhouse gas emissions need to be located, recognized, and reduced, rather than adding more sites that will continue to leak methane. (Increasing methane emissions from swamps and melting permafrost present challenges enough!)

Third, the overriding focus of the SEIS in its examination of the impacts of the proposed Tacoma LNG plant is on the idea that there is a current need for a so-called “bridge fuel”, as if the methane leaks can be dealt with gradually, because the time of reckoning with climate change is distant. That is simply wrong! The time for bridge fuels is past. Popular magazines today chronicle the damage climate change is wreaking **right now**: stories of disappearing species and ecosystems, damage done daily to people, cities, agriculture, and ecosystems because of hurricanes, wildfires, storm flooding, sea level rise, overheated streams killing spawning salmon, fisheries failing—all due to the effects of ***current*** levels of greenhouse gases. We do not have a way to prevent these catastrophes, and ***we cannot continue to set policy by placing our trust in future solutions***. We need to draw a line now. Already we have an

1319-4 cont'd 3. Outside of SEIS Scope
1319-5 3. Outside of SEIS Scope

unacceptable quantity of greenhouse gases. It makes no sense to start new extraction sites and build new infrastructure for a gas more dangerous than CO_2, -- 86 times worse at trapping heat, yet invisible to people and able to escape from fractured earth, old pipes and valves, and other place it's handled. We are releasing a malignant genie from its bottle! We would be better off leaving it deep in the earth and working with renewable clean sources of energy instead. Moreover, the negative impacts of fracked gas won't stop when we stop producing it, because it will continue to require expensive site cleanup (of toxic materials displaced during mining/fracking into aquifers and onto agricultural lands); monitoring and containment (of methane leaking into the atmosphere from the disturbed geologic beds); and treatment of associated health issues (from contaminated water, soil, and air). Every removal site, especially fracked wells, adds to the costs.

Final Thoughts

An October 8, 2018 report from the Intergovernmental Panel on Climate Change[5], coincidentally released on the same date as this SEIS, explains the results of their studies of what differences are projected in 2100 if we succeed in holding global warming to 1.5^{O} above pre-industrial levels, as opposed to 2^{o} above. "For instance, by 2100, global sea level rise would be 10cm lower with global warming of 1.5^{o}C compared with 2^{O}C. The likelihood of an Arctic Ocean free of sea ice in summer would be once per century with global warming of 1.5^{o}C, compared with at least once per decade with 2^{O}C. Coral reefs would decline by 70-90 percent with global warming of 1.5^{o}C, whereas virtually all (>99 percent) would be lost with 2^{O}C."

Jim Skea, Co-Chair of IPCC Working Group III warns that, "Limiting warming to 1.5^{o}C is possible within the laws of chemistry and physics but doing so would require unprecedented changes." Another observation is that although some of the kinds of actions that will be needed have already been started around the world, they will need to accelerate to succeed by 2030. The report lists impressive and thorough research and study statistics: 91 authors from 44 citizenships and 40 countries of residence, including 14 coordinating lead authors, 60 lead authors, and 17 review editors; an additional 133 contributing authors; over 6,000 cited references; and a total of 42,001 expert and government review comments.

I agree with Priyardarshi Shukla, Co-Chair of IPCC Working Group III, that, "This report gives policymakers and practitioners the information they need to make decisions that tackle climate change while considering local context and people's needs. ***The next few years are probably the most important in our history."***

Sincerely,
Rayna Holtz, PSE Ratepayer from Vashon Island
raynaholtz@aol.com

[1] "Ten Worst Greenhouse Gases," by Anne Marie Helmenstine, Ph.D., Thoughtco.com

[2] "New Science Reveals Climate Pollution From B.C.'s Oil and Gas Industry is More Than Double What Government Claims," by Emily Fister, David Suzuki Foundation, April 26, 2017.

[3] https://davidsuzuki.org/wp-content/uploads/2018/07/mobile-measurement-methane-emissions-natural-gas-developments-northeastern-british-columbia-canada.pdf

[4] "Study Finds Methane Leaks Negate Benefits of Natural Gas As a Fuel for Vehicles," by Coral Davenport, Feb. 13, 2014, *New York Times.*

[5] "Summary for Policymakers of PICC Special Report on Global Warming of 1.5^{o}C Approved by Governments," at http://www/ipcc.ch/news_and_events/pr_181008_P48_spm.shtml

The full name of the report is "Global Warming of 1.5^{o}C, an IPCC Special Report on the Impacts of Global Warming of 1.5^{o}C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty."

Puget Sound Energy Liquid Natural Gas Plant
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and build new infrastructure for a gas more dangerous than CO_2 – 86 times worse at trapping heat, yet invisible to people and able to escape from fractured earth, old pipes and valves, and other place it's handled. We are releasing a malignant genie from its bottle! We would be better off leaving it deep in the earth and working with renewable clean sources of energy instead. Moreover, the negative impacts of fracked gas won't stop when we stop producing it, because it will continue to require expensive site cleanup (of toxic materials displaced during mining/fracking into aquifers and onto agricultural lands); monitoring and containment (of methane leaking into the atmosphere from the disturbed geologic beds); and treatment of associated health issues (from contaminated water, soil, and air). Every removal site, especially fracked wells, adds to the costs.

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Sincerely,
Rayna Holtz, PSE Ratepayer from Vashon Island
raynaholtz@aol.com

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[2] "New Science Reveals Climate Pollution From B.C.'s Oil and Gas Industry is More Than Double What Government Claims," by Emily Fister, David Suzuki Foundation, April 26, 2017.
[3] https://davidsuzuki.org/wp-content/uploads/2018/07/mobile-measurement-methane-emissions-natural-gas-developments-northeastern-british-columbia-canada.pdf
[4] "Study Finds Methane Leaks Negate Benefits of Natural Gas As a Fuel for Vehicles," by Coral Davenport, Feb. 13, 2014, *New York Times*.
[5] "Summary for Policymakers of PICC Special Report on Global Warming of 1.5°C Approved by Governments," at http://www/ipcc.ch/news_and_events/pr_181008_P48_spm.shtml
The full name of the report is "Global Warming of 1.5°C, an IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty."

1461-1 22. General Opposition

From: Susan Horky
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 10:04:19 AM

Name: Susan Horky
Email: horky.susan@gmail.com
Address: 2115 NE 37th Ave - 2115 NE 37th Ave.
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This land is private and sacred for the Native Americans.
,This is THEIR land and we must respect them and their lands,

0587-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about how these projects will increase greenhouse gas emissions. It seems clear that any increase in extraction, transport & usage of fracked gas will have potentially devastating effects on human health, the environment and future generations.

Please include detailed information & best current science on methane leakage & operational emission in your studies.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Matthew Horaitz	Email: matthew.d.horaitz@gmail.com
Address: 7934 Seward Park Ave S. Seattle WA 98118	Phone: 206 372-7810

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2129-1 22. General Opposition

I am very concerned about how these projects will increase greenhouse gas emissions. It seems clear that any increase in extraction, transport & usage of fracked gas will have potentially devastating effects on human health, the environment and future generations.

Please include detailed information & best current science on methane leakage & operational emissions in your studies.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Matthew Horwitz	Email: matthew.d.horwitz@gmail.com
Address: 7934 Seward Park Ave S. Seattle WA 98118	Phone: 206 372-7810

1989-1 23. General Support

From: Russell Horton
To: Public Comment
Subject: PSE"s Tacoma LNG Facility
Date: Wednesday, November 21, 2018 4:04:08 PM

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle, WA 98101

Puget Sound Clean Air Agency:
Please approve Puget Sound Energy's LNG facility in Tacoma. I am in support of this project and the facility because of the following reasons:
- the facility will provide positive employment contributions to the community and region;
- LNG fuel use on deep-draft ships offers a "cleaner" alternative for our local air quality (vs. use of heavy fuel oil on deep-draft ships);
- an LNG facility would provide a "localized" competitive advantage for our region because global shipping companies will be looking to obtain LNG fuel in the future. A port that cannot (would not) offer an LNG loading facility for commercial vessels may not be able to "host" port stays for deep draft ships that burn LNG as a propulsion fuel (ship owners that operate LNG-powered vessels are more-likely to enter ports that offer an LNG fueling option). Tacoma and the general region would be seen as "backwards" if LNG fuel for deep draft ships is not available in the port/region in the future;
- this facility creates an excellent addition to the regional infrastructure by providing a better "storage/holding" facility for LNG that can be utilized at "peak-use" times (the current infrastructure during "peak-use" has inherent risks to the region; the designed engineering improvements provided by utilization of the LNG facility will mitigate risk of hazards associated with the current system at "peak-use" times)
- the designed redundancies, designed safety protocols, and designed safety procedures of the facility allow for operation with absolute minimal risk to the general public and to the environment; and
- this facility will create positive, long-term economic impact for the end-users of natural gas (thousands of residential customers).

This statement is written in support of Puget Sound Energy's Tacoma LNG facility, during PSCAA's draft SEIS comment period.

Respectfully Submitted,
Russell Horton
Tacoma resident at:
2801 Garfield Road
Tacoma, WA 98403

1459-1 22. General Opposition

From: Troy Horton
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 10:50:20 AM

Name: Troy Horton
Email: troy.horton@zona.net
Address: 71257 Northshore Dr. -
Birkenfeld, Oregon 97016

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Our children deserve a livable world to live in.

Troy Horton

1510-1 22. General Opposition

From: Troy Horton Horton
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:51 PM

Name: Troy Horton Horton
Email: troy.horton@zona.net
Address: 71257 Northshore Dr. -
Birkenfeld, Oregon 97016

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Our Children deserve a livable world!

1528-1 22. General Opposition

From: Sabolch Horvat
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:11:48 PM

Name: Sabolch Horvat
Email: Sabolch.horvat@gmail.com
Address: 4442 NE Alberta St -
Portland, Oregon 97218

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Thank you for listening to the community

1726-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 10:31:36 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Denise HOTCHKISS
deniseh.edmonds@gmail.com
98208

1503-1 22. General Opposition

From: Jynx Houston
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:15 PM

Name: Jynx Houston
Email: jynxcdo@gmail.com
Address: 7605 SE Lincoln St. -
Portland, Oregon 97215

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

AS A RESIDENT OF THE NORTHWEST I & MY ENTIRE FAMILY IMPLORE YOU TO NOT ALLOW FURTHER DESPOLIATION OF THIS ALREADY-FOSSIL FUEL-BESIEGED REGION BY PERMITTING FRACKING IN TACOMA. PLEASE THINK OF ALL THE WELL-KNOWN HAZARDS ASSOCIATED W/ FRACKING--A VERY SHORT-TERM SOLUTION AT BEST--& DO THE RIGHT THING FOR THE NORTHWEST: NO FRACKING!!!!

1699-1 5. Regulatory Framework

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 10:27:43 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Sincerely,

Jared Howe
jaredchowe@gmail.com
98108

Carole: Thank you. Doug Howell?

Doug: Hi. My name is Doug Howell. I work for Sierra Club. And 21 years ago, I was on the standing advisory committee for the Puget Sound Clean Air Agency. And Steve, I remember your work. You've always been incredibly diligent. And I am disappointed.

[02:26:00] This is not the Clean Air Agency I've always known. You've always been so diligent in your work. And this is a huge shortcoming. Two quick technical points. PM benefit here on LNG just doesn't exist anymore. The only real PM threat you've ever issued has been from the wild fires being caused by global warming. And that argument about LNG of being a benefit for PM, particulate, it's just smoke and mirrors. The second part on the technical point on BC gas is that you have to look at, over time, where that gas comes from. They're cherry picking out of BC, and their data, according to David Suzuki Foundation, is wrong anyway.

You have to take a broader look of where all gas comes from to really get a true picture of what the source is. But let's go to a more important issue. You are setting an incredible precedent here. You cannot afford to be extremely diligent, and you're not there yet. You have to go back to the drawing board. You just haven't crossed that finish line of putting something forward that has enough integrity that you've always brought to the job.

[02:27:03] One last point. Most people don't know this. We started to do an analysis of Puget Sound Energy's inventory, and we started to take a look at their upstream. It's our assertion now that Puget Sound Energy is the largest greenhouse gas polluter in Washington State. Their own inventory is 15 million tons, if you put in the upstream, it's 20 million. Reference point, Washington State is 95 million. We need upstream for that inventory. Puget is No. 1. We are enabling them to dig the hole deeper.

Not only are they the biggest polluter, but they're the most important company for stopping global warming, when we clean up electricity and electrify everything. But there's one primary principle before that. Stop digging the hole deeper. No LNG.

1136-1 13. LCA Inputs and Assumptions - Natural Gas Source
1136-2 3. Outside of SEIS Scope

1338-1 22. General Opposition

From: Lester and Judy Hoyle
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, November 18, 2018 9:37:07 PM

Name: Lester and Judy Hoyle
Email: jalh2@frontiernet.net
Address: 765 Mesa Verde Dr. -
Cave Junction, Oregon 97523

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

In case you haven't noticed, the American West is on fire. This follows catastrophic fires in Greece and Portugal, Hurricane Michael, etc.
EVERYTHING we do now is critical to the survival of the Biosphere.
What will YOU be doing to DIMINISH Global Climate Catastrophe??

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:44:11 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

It is morally bankrupt to take land from indigenous people and then pollute the land, air, and water to make the place toxic for future generations. I am addressing the refinery as well as the source, and speaking of Native Americans as well as farmers who have contracted for fracking in their land. The fracking industry has been deceitful to farmers about the long term toxic effects and has not been accountable for environmental damage. We should be investing in clean energy.

Sincerely,

Jennifer Hrachovec
jhrachov@gmail.com
98115

1707-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:27:12 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

It is morally bankrupt to take land from indigenous people and then pollute the land, air, and water to make the place toxic for future generations. I am addressing the refinery as well as the source, and speaking of Native Americans as well as farmers who have contracted for fracking in their land. The fracking industry has been deceitful to farmers about the long term toxic effects and has not been accountable for environmental damage. We should be investing in clean energy.

Sincerely,

Jennifer Hrachovec
jhrachov@gmail.com
98115

1346-1 22. General Opposition

From: trace Hulette
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 11:52:35 AM

Name: trace Hulette
Email: t.a.hulette@gmail.com
Address: 1221 nw 11th -
Portland, Oregon 97209

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Bad idea- no pipeline. No natural has depot.
Not good for the planet and an environmental ‘no-no.’

0462-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

As a mother of two and avid outdoors person I deeply concerned about the impact the LNG will have on global warming. We have already suffered through an unbearable month in summer with unbreathable air. The LNG plant will not reduce greenhouse gas emissions based on the most current GWP which was not used in the SEIS. It is critical that the SEIS be redone using 20 year GWP data, which is the most current.

Please include this in the final supplemental environmental impact statement.

Name: Karen Hume	Phone: 253-503-5525
Address: 3714 N. 24th St Tacoma	Email: karenhume1969@gmail.com

0463-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

Puget Sound Clean air has promised to protect citizens from air pollution. This cannot be achieved if you accept the current SEIS for the LNG. The GWP used in the current report is outdated. The SEIS needs to be redone using the most current 20 year GWP (we do not have 100 years).

Please include this in the final supplemental environmental impact statement.

Name: Karen Hume	Phone:
Address: 3714 N 24th St 98406	Email: karenhume1969@gmail.com

0464-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

I am a father and have a family member with respiratory issues. I am concerned about the smoke from the increase in wild fires. I would like you to use the Green house Warming potential (GWP) for 20 years rather than 100 years. I am concerned about climate change in the next 20 years.

Please include this in the final supplemental environmental impact statement.

Name: Matt Hume	Phone: 253-503-5525
Address: 3714 N. 24th street Tacoma WA 98406	Email:

0465-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Puget Sound Clean Air Agency,

I am a Tacoma resident and a father of two. I'm concerned about the impact of climate change on future generations, and the urgency of this issue. Although the draft SEIS finds that the LNG plant will reduce greenhouse gas emissions, I'm concerned about the major uncertainties in the upstream methane leak calculations. Please redo the SEIS with a full uncertainty analysis.

Please include this in the final supplemental environmental impact statement.

Name: Matt Huma	Phone: 253-503-5525
Address: 3714 N. 24th Street Tacoma WA 98406	Email:

2571-1 22. General Opposition
2571-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2571-3 13. LCA Inputs and Assumptions - Natural Gas Source
2571-4 7. SEPA Alternatives
2571-5 19. LCA Inputs and Assumptions - End Use
2571-6 10. LCA Calculations
2571-7 22. General Opposition

From: Rhon@everyactioncustom.com on behalf of Rhonda Hunter
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Monday, October 29, 2018 2:18:37 PM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project.

Methane is an even more short-term greenhouse gas than CO2, and LNG is Methane. Leaks occur all along the drilling and transfer routes, which accelerates climate change and associated disasters.

Explosions from this plant put too many people at risk, and methane is HIGHLY explosive (Remember the Bellingham explosion?)

Incomplete data and too many alterations of this project make this SEIS a moving target and too difficult to assess accurately. Please clean it up and resubmit for public comment.

We need clean energy far more than we need more polluting methane. It's not natural and it's not a bridge fuel. It's a huge part of the greenhouse gas problem.
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Ms. Rhonda Hunter
PO Box 128 Littlerock, WA 98556-0128

2005-1 23. General Support

From: Michael Hutchinson
To: Public Comment
Subject: Puget Sound Energy - Tacoma Liquefied Natural Gas Project
Date: Monday, October 29, 2018 11:00:14 AM

As a long-time resident, an environmental scientist (Masters of Science in Geology) and a local business person I feel very strongly about keeping our waterways and shorelines clean and safe, our air healthy, and our public services properly funded. It is from this background that I express my support for the Puget Sound Clean Air Agency (PSCAA) to finalize the draft SEIS it presented on October 8, 2018 and to issue the permit(s) that Puget Sound Energy (PSE) has requested for its liquefied natural gas (LNG) facility at the Port of Tacoma. I appreciate projects that will lead to increased tax revenues to help our local schools and public safety departments.

The LNG facility will improve our marine environment by providing a cleaner fuel alternative. LNG reduces the risk of fuel spills over water thereby preventing damage our waterways. It will also help reduce greenhouse gas emissions and virtually eliminate visible particulate emissions produced by ships. This is a very favorable outcome for the citizens of Tacoma and the entire South Sound region, namely better air quality with accompanying reduction in health risks.

I strongly support the region's efforts to create a healthy business climate for local companies who choose to do business in Tacoma. Tacoma is a working industrial marine port-based community, and both TOTE and PSE are respected, long-time area businesses here. We all benefit from both the family wage jobs they provide within the Port, and the fact that both are committed to using the best available environmental technology to remain competitive in the world economy is a boon to our entire community.

I am confident in the conclusion of the draft SEIS that the project will result in a decrease in GHGs. I look forward to publication of a Final SEIS that confirms the draft's conclusions about LNG fuel benefits. I urge you to move forward and approve the PSCAA permit(s) for Tacoma LNG. This project will provide great benefits to the citizens of Tacoma, Pierce County, and the South Sound region for years to come.

Mike Hutchinson
Tacoma Resident

0634-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

As a parent of a child affected by asthma, I think it is essential to consider the additional PM' pollution that will be produced at the methanol refinery from the tankers transporting it through WA waters. PM pollution is also produced in fracking from all the diesel trucks transporting water.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: 1278 NW Blakely Ct
Address: idzerda@comcast.net	Phone: 2063676634

0635-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned by the contamination of aquifers and drinking water by the toxic chemicals used in fracking, such as benzene, toluene, etc. These chemicals are known to cause cancer. There is evidence that of higher rates of hospitalization for various health issues near well sites. Please include consider these health issues.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: idzerda@comcast.net
Address: 1278 NW Blakely Ct	Phone: 706-367-6634

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I'm concerned about the potential for substantial MeThane leakage into the atmsphere throughout the supply and transport chain. MeThane is a potent greenhouse gas and driver of climate change. Please consider this leakage and its impact on climate change.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: idzerda@comcast.net
Address: 1278 NW Blakely Ct 98177	Phone: 206 3676634

0642-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I'm concerned about the impact of a methanol spill in the Columbia River on salmon. Our Orca whales are already starving. We can not risk wiping out the salmon with a spill. Please consider that impact.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: idzerda@comcast.net
Address: 1270 NW Blakely Ct 98177	Phone: 206 367 6634

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned that the impacts of the methanol refinery have only been looked at assuming operation at a fraction of capacity. Please study the environmental impact of it operating at full capacity. Otherwise why would they build a plant and not operate it!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: idzerda@comcast.net
Address: 1278 NW Blakely Ct Seattle 98177	Phone: 206-367-6634

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2142-1 3. Outside of SEIS Scope

I am concerned that the impacts of the methanol refinery have only been looked at assuming operation at a fraction of capacity. Please study the environmental impact of it operating at full capacity. Otherwise why would they build a plant and not operate it!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	**Email:** idzerda@comcast.net
Address: 1278 NW Blakely Ct Seattle 98177	**Phone:** 206-367-6634

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2144-1 3. Outside of SEIS Scope

I'm concerned about the impact of a methanol spill in the Columbia River on salmon. Our Orca whales are already starving. We can not risk wiping out the salmon with a spill. Please consider this impact.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	**Email:** idzerda@comcast.net
Address: 1270 NW Blakely Ct 98177	**Phone:** 206 367 6634

2146-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I'm concerned about the potential for substantial MeThane leakage into the atmsphere throughout the supply and transport chain. MeThane is a potent greenhouse gas and driver of climate change. Please consider this leakage and its impact on climate change.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	**Email:** idzerda@comcast.net
Address: 1278 NW Blakely ct 98177	**Phone:** 206 3676634

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2149-1 3. Outside of SEIS Scope

I am concerned by the contamination of aquifers and drinking water by the toxic chemicals used in fracking, such as benzene, toluene, etc. These chemicals are known to cause cancer. There is evidence that of higher rates of hospitalization for various health issues near well sites. Please include consider those health issues.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: idzerda@comcast.net
Address: 1278 NW Blakely Ct	Phone: 706-367-6634

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2152

2152-1 3. Outside of SEIS Scope

As a parent of a child affected by asthma, I think it is essential to consider the additional PM' pollution that will be produced at the methanol refinery from the tankers transporting it through WA waters. PM pollution is also produced in fracking from all the diesel trucks transporting water.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Rejean Idzerda	Email: 1278 NW Blakely Ct
Address: idzerda@comcast.net	Phone: 2063676634

1822-1 3. Outside of SEIS Scope
1822-2 3. Outside of SEIS Scope
1822-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1822-4 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: rejean idzerda
To: Public Comment
Cc: Sarah Cornett
Subject: Supplemental EIS Tacoma LNG plant
Date: Friday, November 2, 2018 1:47:35 PM

Dear Puget Sound Clean Air Agency,

Thank you for assessing greenhouse gas emissions for the proposed Tacoma LNG plant. I support the position of the Puyallup Tribe in requesting a SEIS with more complete and accurate information.

Having been a UW faculty member in the Departments of Medicine and Pharmacology and having raised a child with asthma, I am very aware of and concerned about the health impacts of adding to our fossil fuel infrastructure.

Any increase in demand for fracked gas will negatively impact British Columbia communities by increasing air and water pollution that exacerbates asthma and heart disease, contributes to premature births and affects the brain and nervous system.

Locally, in Tacoma, there are also risks. The proposed plant will be a complex facility in a busy maritime port, and the risk of explosions and leaks will be borne predominantly by the Puyallup tribe and other local communities. This is not just a hypothetical risk. In 2014, two 14 million-gallon tanks exploded at the Williams Companies LNG facility in Plymouth, Washington.

The estimates of methane leaks from fracking are likely very conservative. Reports cited in the SEIS use industry-reported information. Recent studies suggest that wells and pipelines in B.C. may leak as much as 6 times more than previously reported.

In addition, the modeling of global warming potential for methane emissions uses a 100-year timeframe, but methane's impact is most important over a 20-year timeframe. The SEIS should rely the most recent Intergovernmental Panel on Climate Change analysis, which assesses methane as 86 times more potent than Carbon Dioxide over a 20-year timeframe.

Climate change is already impacting our health in the Puget Sound region. We see the health impacts of extreme heat events and air pollution exacerbated by climate change. Expanding

our fossil fuel infrastructure will prolong our reliance on these polluting fuels.

I ask that you revise this draft Supplemental EIS using the latest science and accurate accounting of lifecycle greenhouse gas emissions.

Sincerely,

Rejean Idzerda, PhD

1509-0 23. General Support

From: Elizabeth Ilem
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:51 PM

Name: Elizabeth Ilem
Email: Ilemek52@gmail.com
Address: 975 SE 29TH ST -
TROUTDALE, Oregon 97060

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I agree fully with this letter.

1356-1 22. General Opposition

From: Erin Inclan
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 12:39:39 PM

Name: Erin Inclan
Email: erinclan7@gmail.com
Address: 6726 55th Ave S -
Seattle, Washington 98118

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

A fourth generation citizen of the Pacific Northwest and Puget Sound, I'm writing with real concerns about the propose liquid natural gas project in Tacoma. No, no, no, no, and NO. The SEIS uses bad science and presents misleading information. Please don't mess with the Tacoma tidelands or tribal lands. If you truly care about clean air, then honor the values you include on your website -- and show us what it means to be good and wise stewards of our natural resources right now and for the future.

Did I mention how unhappy we were when the PSE gasoline blew up in our Greenwood, Seattle neighborhood? THANK GOD nobody was hurt. Unfortunately, PSE did blow up one of our favorite businesses, so you'll understand why, like many locals, I don't have much faith in PSE's goodwill or concern about gas leaks, climate change, plants, animals, clean air, or people's lives.

I urge you to take another closer look at the proposed facility, and this time take the best available science into consideration. There is no way for the Agency to uphold its commitments unless you deny the air permit for this facility. You harm us all.

2199-1 22. General Opposition

From: kajsaingelsson@everyactioncustom.com on behalf of Kajsa Ingelsson
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 3:27:56 PM

Dear Responsible Official,

No more digging, no more gas. Let's create a green and clean world together. We must if we want to survive.

Sincerely,
Kajsa Ingelsson
Los Angeles, CA 90046
kajsaingelsson@gmail.com

1795-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:24:25 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Why do this now when we should be investing, promoting, developing clean energy sources?

Sincerely,

Carol Iverson
cscrol@gmail.com
98368

1721-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 11:20:41 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracked gas is not clean. Apart from all the toxic liquids injected into the ground, natural gas itself produces CO2 when burned, and leakages release methane too.

All fossil fuels are harmful, please do everything you can to reduce your use of oil, gas and coal ASAP, and do not invest any more time or money into expanding their use!

Sincerely,

Ian James
ianhjames@hotmail.com
98027

1598-1 3. Outside of SEIS Scope
1598-2 5. Regulatory Framework
1598-3 10. LCA Calculations
1598-4 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Jarvis
To: Public Comment
Subject: NO fracked gas in Tacoma
Date: Thursday, November 15, 2018 4:35:23 PM

Fracked gas LNG project in Tacoma is unacceptable! It would increase our greenhouse gas emissions and further fuel climate change that is on the verge of no return - which means more extreme climate events and wildfires that will only worsen if we continue to pursue fracking (which is a detriment in and of itself) and the gas that comes of it. Our fire seasons have already intensified, causing death, destruction of homes, forests, and wildlife habitat which we keep witnessing across the globe and especially on the US coasts and devastating wildfires in California. Outrageous and as I said, unacceptable. The increased air pollution makes citizens sick and leads to higher rates of asthma attacks, heart problems amongst many other health issues.

Your proposed Liquefied Natural Gas (LNG) refinery, storage and distribution facility in the Tideflats area of Tacoma is inappropriate and unsuitable and frankly intolerable. It is sited on Puyallup Tribal lands and is being built WITHOUT their consent. There are many concerns about the project ranging from taxpayer and ratepayer subsidization, safety issues, and environmental impact.

My words are few, but my objections are many.

Here are other reasons we cannot move forward with this proposal:

These are just some of the shortcomings developed by a coalition of groups including Advocates for a Cleaner Tacoma (ACT), Sierra Club, 350 Seattle, Washington Physicians for Social Responsibility (WPSR) and 350 Tacoma.

- The Draft SEIS is Incomplete – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have “placeholder” values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- SEIS is Using Outdated Methane Global Warming Potential Value – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007

1598-4 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1598-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
1598-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1598-7 13. LCA Inputs and Assumptions - Natural Gas Source
1598-8 6. Purpose and Need
1598-9 14. LCA Inputs and Assumptions - Leakage/Slippage

value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- Analysis is based on 100-year, not 20-year, global warming potential (GWP) values – They base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- Questionable claims that B.C. fracked gas is as clean as they claim – They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- What assurances do we have that all of the fracked gas would come from BC? They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).
- Analysis assumes credit for extra maritime customers that currently do not exist – The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.
- Questionable Methane Slippage Rates for TOTE Vessels – It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own

greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.

- Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Thank you for reading my concerns and considering these reason why this proposal is dangerous. I trust you will show Washingtonians you possess integrity, show your honor and call off all plans for this project anywhere.

Ms. Jarvis

1598-9 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage

1598-10 16. LCA Inputs and Assumptions - Hydraulic Fracturing

2190-1 3. Outside of SEIS Scope

From: john.jeglum@everyactioncustom.com on behalf of John Jeglum
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 10:34:05 AM

Dear Responsible Official,

Recent gov.bc ads and speeches extol our good fortune of having 'clean' LNG and 'clean' hydroelectric to use or sell: "...it will be great for air around the world to use 100 per cent 'clean' energy to displace coal." But with every energy system, in its extraction, transportation, and final use, there is always some amount of greenhouse gas or heat released.

'Clean' energy is best defined as an energy system which emits insignificant amounts of chemical, particulate, radiation, or carbon pollution after mitigation and remediation. By this definition solar, wind, geothermal, wave and tidal, nuclear, and run-of-the-river hydro are relatively clean (Barnard, CleanTechnica Aug2016)
Fossil fuel generation is never clean no matter how much mitigation and remediation is performed in any part of the system. So when one reads or hears "clean gas" or "clean LNG" this is not correct. There will always be some level of leakage of gas in the upstream, LNG plant, or downstream segments. And even if the LNG is produced partly by electricity from major hydro dams, which themselves are not the cleanest, LNG is a subcomponent of the total 'fracked natural gas-LNG system'.

The 'clean gas' energy as a solution to climate change is a myth. Even if it is sent to other countries, it will be used as a substitute for coal and oil, and delay the true solution developing actual low GHG emitting renewable energies.

John K. Jeglum

Sincerely,
John Jeglum
V9L5T4
john.jeglum@shaw.ca

0614-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about this project's impact on Global Warming because Methane is a greenhouse gas 86 times more powerful than Carbon Dioxide. The EPA is using an out-of-date estimate for Methane's impact on global warming. So the next Environmental Impact statement needs to take the most current science into account when conducting the impact statement on the environment

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N.	Phone: 541-760-9634

0615-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned that the last Environmental Impact Statement did not take all of the environmental impacts that increasing production and exportation of Methanol will have on Global Warming. It is important that this project is recognized as increasing Methanol pollution We cannot afford to continue producing Methanol and burning it, and increasing it's enormous impact on global warming.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address:	Phone:

0616-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about the water impacts from Fracking liquified natural gas. A LNG spill in the puget sound or in any major waterway would create a huge loss of life, and devastate the already ailing salmon population. Please take the health of our eco systems seriously when evaluating the impact of this project.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N Seattle, WA 98105	Phone:

0617-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about the chemicals used in fracking liquified natural gas. Please study all of the chemicals involved and the impacts on human and wildlife of exposure to these chemicals. Please include worst case scenarios for each type of exposure.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N. Seattle, WA 98103	Phone:

0618-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about the human suffering of the community members locked up in the North West Immigrant Detention center, which is located in the blast zone of the proposed Methanol Refinery. Please include the impact of an explosion on the People locked up in the Prison. What would the health impacts and other suffering be caused by a disaster there?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N Seattle, WA 98105	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2168-1 3. Outside of SEIS Scope

I am very concerned about the human suffering of the community members locked up in the North West Immigrant Detention center, which is located in the blast zone of the proposed Methanol refinery. Please include the impact of an explosion on the People locked up in the Prison. What would the health impacts and other suffering be caused by a disaster there?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N Seattle, WA 98105	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2169-1 3. Outside of SEIS Scope

I am very concerned about the chemicals used in fracking liquified natural gas. Please study all of the chemicals involved and the impacts on human and wildlife of exposure to these chemicals. Please include worst case scenarios for each type of exposure.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N. Seattle, WA 98105	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2170-1 3. Outside of SEIS Scope

I am very concerned about the water impacts from Fracking liquified natural gas. A LNG spill in the puget sound or in any major waterway would create a huge loss of life, and devastate the already ailing salmon population. Please take the health of our eco systems seriously when evaluating the impact of this project.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N Seattle, WA 98105	Phone:

2171-1 3. Outside of SEIS Scope

lear Port of Kalama, and Cowlitz County,
lear Puget Sound Clean Air Agency,

I am very concerned that the last Environmental Impact Statement did not take all of the environmental impacts that creasing production and exportation of Methanol will have on Global arming. It is important that this project is recognized as ncreasing Methanol pollution. We cannot afford to continue roducing Methanol and burning it, and increasing it's ncrimous impact on global warming.

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address:	Phone:

2172-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am very concerned about this project's impact on Global Warming because Methane is a greenhouse gas 86 times more powerful than Carbon Dioxide. The EPA is using an out-of-date estimate for Methane's impact on global warming, so the next Environmental Impact Statement needs to take the most current cience into account when conducting the impact statement on he environment

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Johanna Lundahl	Email: jolundahl@hotmail.com
Address: 8226 Meridian Ave N. Seattle WA 98103	Phone: 541-760-9634

From: Brett Johnson
To: Public Comment
Subject: comment in regard to LNG facility
Date: Monday, November 5, 2018 5:43:42 PM

Dear PSCAA,

Honestly, I don't have a lot to add to the already thorough and detailed public commentary in opposition to the LNG facility in Tacoma. I am a very active Sierra Club member in our local Tatoosh Group, and focus most of my efforts on park stewardship, environmental restoration, and supporting environmentally-minded local candidates for office. Thus, I admit that I am not an expert on this LNG issue. However, I do understand the big picture, how the LNG facility affects our future, and how this permit would enable its undesirable consequences.

Climate change is the challenge of our time. The science continues to reveal that the situation is more dire than we have previously imagined. By denying this LNG permit, we are essentially saying "NO" to more fossil fuel infrastructure that will only make it more difficult to reduce greenhouse gas emissions over the coming years. The extraction, transportation, and processing of LNG provides multiple opportunities for methane to leak into our atmosphere and compound our global warming problem. Methane is over 80 times as potent as carbon dioxide as a greenhouse gas. We are already seeing unusual amounts of methane emerging from the northern tundra as long-frozen permafrost melts away. We are already losing the battle, so let's not compound the problem with even more methane pollution!

Finally, I speak as a father of a 5-year-old. My daughter and her peers will inherit whatever environment we choose to give them. If encouraging LNG production is likely to increase methane emissions and therefore exacerbate climate change, we ought to stop it in its tracks. I urge the PSCAA to deny this permit. Thank you for your time and consideration,

Brett M. Johnson
Executive Committee Member
Sierra Club Tatoosh Group of Pierce County

2191-1 22. General Opposition

From: calebjmusic@everyactioncustom.com on behalf of Caleb Johnson
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 10:13:45 AM

Dear Responsible Official,

Humanity cannot continue its habitual maintenance of the status quo by digging up more fossil fuels. The latest global reports continue to show that the time is now to change our energy supply, not tomorrow. NO MORE FOSSIL FUEL! Clean energy NOW!

Sincerely,
Caleb Johnson
Baton Rouge, LA 70802
calebjmusic@gmail.com

1587-1 19. LCA Inputs and Assumptions - End Use

From: Christian Johnson
To: Public Comment
Subject: LNG SEIS public comment
Date: Friday, October 26, 2018 12:51:13 PM

Dear PSCAA,

As a Tacoma resident and PSE customer and ratepayer, I am against the LNG facility. I am not willing to pay extra in my bill every month to cover the cost of that tank.

Will the SEIS cover transport such as trains and trucks? I-5 is one of the busiest freeways in the U.S. Tacoma has several oil trains running through it everyday and PSE wants to use the railways for LNG? What if there is an accident? Who will be responsible for the costs? PSE won't because they are an LLC and will just pick up and leave us in the rubble.

The LNG is dangerous and corrupt. There is a lot of information that is being kept from the public.

-Christian Johnson

1646-1 17. LCA Inputs and Assumptions - Peak Shaving

From: Christian Johnson
To: Public Comment
Subject: Public comment on fracked gas facility
Date: Sunday, October 28, 2018 6:31:15 PM

Dear PSCAA,

The peak shaving purpose does not add up. The peak shaving is only for 10 years and after that it goes to for-profit corporations. We all know that PSE will export this gas to questionable foreign countries like China and Russia.

A revised complete SEIS should be provided and a new full public comment period should be provided. The city should not have been the lead SEPA agency- it was a conflict of interest since 2 council members wrote a letter approving of the LNG project.

-Christian Johnson

Carole: Thank you. Steward Zimmerman? Dr. Lisa Johnson?

Lisa: Good afternoon. My name is Dr. Lisa Johnson. I'm a family physician and a long term Physician for Social Responsibility member. I've also lived on Puget Sound for about 40 years. I'd like to speak regarding the health of all of our members of our community. First, I thank you for your decision to assess the lifecycle greenhouse gas emissions for this Tacoma LNG project.

[01:56:05] We, at PSR, support the position of the Puyallup Tribe in encouraging a supplemental EIS with more complete and more accurate information. First, we're concerned about the effects of methane emissions on the environment. We've talked about the IPCC report and the impact of methane over a 20 year cycle, instead of 100 year cycle and know that methane's effects are 86 times more potent than carbon dioxide over the 20 year period. And the SEIS should use that model for its analysis. We're also concerned about methane leaks from fracking in British Columbia.

Recent studies have shown that wells and pipelines in BC may leak as much as six times more than has been previously reported.

[01:57:02] And that is also not included in the EIS. As health professionals, we're also concerned about an increase in fracked gas demand, which could worsen the health of our Canadian neighbors. That is, effects of air pollution that exacerbate asthma, heart disease, chronic pulmonary disease and premature births. I also want to say that flammable emissions from LNG bunkering could pose a significant risk of explosion in the busy port with lives and infrastructure in the balance. In summary, with this in mind, we ask that you revise this draft SEIS using the latest science and accurate accounting of lifecycle greenhouse gas emissions. Thank you.

1176

1176-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1176-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1176-3 3. Outside of SEIS Scope

2193-1 3. Outside of SEIS Scope

From: djohnson-deal@everyactioncustom.com on behalf of Dawn Johnson-Deal
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 9:04:00 AM

Dear Responsible Official,

We are watching and we won't be silent. Fracking is a shameless attack on Mother Earth. This is well-documented. You know this to be true. Don't allow the moneyed interests to overrule common sense. We can do better.

Sincerely,
Dawn Johnson-Deal
Longview, WA 98632
djohnson-deal@tdn.com

[03:24:04] So, next speaker would be Deborah Hill. Kyle Jolibois?

Kyle: Good evening. My name is Kyle Jolibois. I was born in St. Joe's Hospital, Hilltop. Lifetime resident. And I thought this was about air. And all we've been talking about is 17 jobs that this may incur.

[03:25:00] I live in the blast zone. I live on Broadway, two blocks away, four blocks down. I can see this monster in my backyard. And it's supposed to be not completed yet because it doesn't have your permit. But this thing is huge. I can see it with the naked eye 2.2 miles from my house. And every day, as I leave my house, I look at the port, and I can see West Rock and all the fumes they pollute our skies with. And you want to put in LNG that the report is incomplete. Let me ask you this, sir. Would you be sitting there if you ever done anything incomplete? No, you wouldn't. Nothing gets done that's incomplete.

[03:26:03] And all we're asking for is a complete report. You guys are rushing this, and I don't know why. This is going to devastate Tacoma. The reports are that the port is going to be under water in 30 years. Then what? I think this is a huge mistake for Tacoma. I just think you would take some more consideration in what you're doing because it's going to affect a lot of people. Thank you.

From: Bradley Jones
To: Public Comment
Subject: Clean Air
Date: Sunday, November 18, 2018 5:09:55 PM

- **The Draft SEIS is Incomplete** – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- **SEIS is Using Outdated Methane Global Warming Potential Value** – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- **Analysis is based on 100-year, not 20-year, global warming potential (GWP) values** – They base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- **Questionable claims that B.C. fracked gas is as clean as they claim –** They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- **What assurances do we have that all of the fracked gas would come from BC?** They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).
- **Analysis assumes credit for extra maritime customers that currently do not exist –** The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.
- **Questionable Methane Slippage Rates for TOTE Vessels –** It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells** – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

1535-1 10. LCA Calculations
1535-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1535-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1535-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1535-5 13. LCA Inputs and Assumptions - Natural Gas Source
1535-6 19. LCA Inputs and Assumptions - End Use
1535-7 14. LCA Inputs and Assumptions - Leakage/Slippage
1535-8 16. LCA Inputs and Assumptions - Hydraulic Fracturing

1608-1 22. General Opposition

From: Evan Jones
To: Public Comment
Subject: PGE LNG
Date: Saturday, November 17, 2018 9:24:59 PM

To Whom It May Concern - DON'T BUILD THIS FACILITY. WE FACE AN EXISTENTIAL CRISIS THAT DEMANDS MAKING THE RIGHT DECISION FOR THE SAKE OF OUR RACE, ON THIS ONLY PLANET WE HAVE

Respectively,

Evan Jones
1666 Cambridge DR SE
Salem, OR

1862-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

During consideration of this plan the IPCC released their latest report proving that the time to put an end to new fossil fuel infrastructure is well behind us! You could not make a more irresponsible decision than to approve a terminal in Tacoma.

_____(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Jennifer Jones Email: jennifer@not23.com

Address: 5516 NE 27 Ave Portland Or. 97211

By completing this comment card you agree to receive updates about the project.

1909-1 21. LCA Inputs and Assumptions - Additional Air Pollutants



Photo courtesy of and © Greg Vaughn
www.GregVaughn.com

POBOX 11442
Portland, OR 97211

PLACE HERE

The proposed Fracked Gas terminal in Tacoma has been projected to release ammonia, arsenic, cadmium and sulfer dioxide into our air. How could you even be considering such a public health catastrophe? The IPCC report has strongly advised that time is running out for human beings to put all our resources into renewable energy projects. Please put a stop to this terminal.

- Jennifer Jones

© 2017 CollectiveVision.us

Puget Sound Clean Air
ATTN: Public Comment
on DSEIS, PSE LNG project
1904 3rd Ave
Suite 105
Seattle, WA
98101

RECEIVED
NOV 13 2018
Puget Sound Clean Air Agency

RECEIVED
NOV 13 2018
Puget Sound Clean Air Agency

1682-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 8:13:19 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I oppose this for several reasons, including the fact that climate change means we cannot allow new fossil fuel infrastructure. Period!
And I oppose on the grounds of environmental justice- this disproportionately affects disadvantaged communities by adversely impacting air quality.
Let's move away from air pollution, greenhouse gas emissions, and toward green energy sources including solar and wind.

Sincerely,

Jenny Jones
redshoulderedhawk@hotmail.com
97219

Carole: Thank you. Steve Gilbert? Kevin Jones?

Kevin: Hello, and thank you for the opportunity to speak today. I want to introduce myself as a person who has had 35 years of engineering program management experience, including risk management.

[01:09:02] I am not paid to be here. I'm retired and received no compensation for my testimony today. I want to thank you for performing a supplemental environmental impact statement. I was very concerned regarding the upstream gas emissions comment from the city of Tacoma, which, basically, said those are too remote to the project site and the city of Tacoma to be part of the EIS. Of course, we know those emissions go into the one climate that we have. My concern of what I've heard today is a reliance on the reliability and accuracy of the supplemental environmental impact statement. I think you've heard a few reasons why that is to be not trusted.

I, myself, have looked at some numbers and believe that it is some fiction in what you have seen and, therefore, what we're trying to base our analysis on. The notion of gas as a bridge fuel I think is now a known myth, due to the higher than reported gas leaks. And I have a couple of references I'll bring up.

[01:10:00] So, I'm concerned that the supplemental environmental impact statement makes unreasonable assumptions about these emissions. Historically, upstream gas emissions are higher than reported. In 2016, *The Economist*, which is not a liberal newspaper, noted that gas leaks in America are underestimated by about 30%. The Atmospheric Chemistry and Physics Group recently reported that gas leaks in British Columbia are underreported by 43%.

If this assessment is applied to the upstream gas emissions in the supplemental environmental impact statement, we find the greenhouse gas emission savings from the proposed action drops from 40,000 tons of reduced emissions to only 6,440 tons for Scenario A. If you base a permit approval on a net greenhouse gas reduction of less than one percent that is not good engineering practice, and it would never pass muster in an engineering class.

[01:11:00] I'm also concerned about the fugitive emissions from British Columbia. The concern about whether or not the source is reliable over the life expectancy of this facility. Some people have characterized we need the facility to mitigate the disruptions due to pipeline explosions. I would claim that pipeline explosions is a threat to the basis upon which the proposal is made because you

1172-1 13. LCA Inputs and Assumptions - Natural Gas Source
1172-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1172-3 5. Regulatory Framework

need a supply, in order to make the system work. So, I view that this project does not have an acceptable risk posture regarding greenhouse gas emissions.

When other system level factors are considered like the outdated global warming potential values and using 100 year versus 20 year values, the supplemental EIS conclusions are just not credible. Based on these factual errors in the SEIS, you must reject this permit. Thank you for your time.

1172-4 12. LCA Inputs and Assumptions - Global Warming Potential Value

1308-1 3. Outside of SEIS Scope
1308-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1308-3 13. LCA Inputs and Assumptions - Natural Gas Source
1308-4 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Kevin Jones
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 12:16:46 PM

Tacoma LNG Facility Testimony – Puget Sound Clean Air Agency

My name is Kevin Jones. I am a PSE ratepayer. I have 35 years of engineering project planning, implementation and risk management experience working for The Boeing Company. Now retired, I have not been paid to testify and will receive no financial benefit due to your final permit decision. I oppose issuing the permit to PSE for the Tacoma LNG facility.

Thank you for performing a Supplemental Environmental Impact Statement (SEIS) for the Tacoma LNG Facility. I was quite concerned when upstream gas emissions were dismissed by the City of Tacoma as "too remote to the project site and the City of Tacoma to be part of the EIS". Of course, these emissions pour into the only climate we have.

Unfortunately, the SEIS conclusion is based on upstream gas emissions which are not credible. Gas as a bridge fuel is now a known myth due to much higher than reported upstream methane leaks. The SEIS makes erroneous and unreasonable assumptions about these upstream gas emissions. Historically, upstream gas emissions are higher than reported. In 2016 The Economist noted that upstream gas leaks in the United States are underestimated by about 30%. The Atmospheric Chemistry and Physics group recently reported that gas leaks in British Columbia are under-reported by 43%. If this assessment is applied to the upstream gas emissions in the SEIS we find the stated greenhouse gas emission reduction of the proposed scenario A action falls from 40,000 tons to 6440 tons.

Basing permit approval on a net greenhouse gas emission reduction of less than 1% would not pass muster in a high school level engineering class. Further, a permit issued for the LNG facility, based on this erroneous SEIS, will result in a fossil fuel facility investment that locks us into an approach that provides no proven environmental benefits over a multi-decade time period during which time true environmental solutions to maritime shipping pollution could emerge.

In addition to the unreliable British Columbia fugitive gas emission data, the SEIS also assumes a reliable British Columbia delivery network over the entire life span of the facility. The October 9 pipeline explosion, which PSE euphemistically calls an "unexpected rupture", adds significant doubt to this reliability. You heard testimony that the LNG facility can mitigate the risk of a pipeline explosion. In fact, pipeline explosions create significant risk to achieving the important (though specious) SEIS caveat that all the source gas must come from British Columbia.

The SEIS, when corrected to use reasonable upstream gas emission leak levels, indicates an unacceptable risk regarding greenhouse gas emission reductions. The conclusion that the proposed action reduces greenhouse gas emissions is based on SEIS fiction. When other system level factors are considered, like the outdated global warming potential values and using 100-year versus 20-year values, the SEIS conclusions are not credible.

Based on these factual errors in the SEIS, you must reject this permit.

Kevin Jones
Vashon Climate Action Group
206-463-1766
kevinjonvash@gmail.com

2216-1 22. General Opposition
2216-2 3. Outside of SEIS Scope
2216-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Janet Jordan
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 5:08:13 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.

That said, I want the LNG project to end immediately. We must take action if we want to have a livable planet in the future.

Natural Gas has less carbon content than other fossil fuels but its production is just as dangerous. Gas seeps out of the wellheads and gets released during transportation, and in its unburned state it is much more threatening to us than the products of burning coal or oil. Natural Gas in the air is 86 times more potent in creating the Greenhouse Effect than carbon dioxide over a 20--year span. The LNG project in Tacoma will be complicit in releasing natural gas into the air and will create climate chaos just as much as the other forms of fossil fuels.

Please deny this project any permits that are still pending. Thank you.

Janet Jordan
janetjordan@fastmail.fm
6702 Garrett Ct NE
Olympia, Washington 98506

2554-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2554-2 19. LCA Inputs and Assumptions - End Use
2554-3 14. LCA Inputs and Assumptions - Leakage/Slippage
2554-4 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Erika Kane
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 3:32:50 PM

Name: Erika Kane
Email: erikabkane@gmail.com
Address: 6218 Sconce Road -
Hubbard, Oregon 97032

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

We must switch our dependence on fossil fuels to renewable sources of energy. While I appreciate the SEIS process I believe the conclusions are flawed.

The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.

This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?

The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG.
Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.

The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.

How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.

When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

With these points in mind I wonder how the SEIS can conclude that there will be less greenhouse gas produced than if the project does not go forward? I hope that you will take

best available science into consideration when revising this draft SEIS.

Sincerely,
Erika Kane

2209-1 22. General Opposition

From: michael@everyactioncustom.com on behalf of Michael Karp
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 11:09:15 AM

Dear Responsible Official,

Stop the insanity of moving ahead with a PSE/Tote Marine proposed LNG project in Tacoma! The health of my grandchildren depends on you!

thank you

Sincerely,
Michael Karp
Lopez Island, WA 98261
michael@awish.net

1368-1 22. General Opposition

From: Gabrielle Karras
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:56:55 AM

Name: Gabrielle Karras
Email: gk2829@hotmail.com
Address: 4210 SE Bybee Blvd -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Draft of the Supplemental Environmental Impact Statement, Washington state created to evaluate this project is obviously flawed and motivated by money. Was it written by the fox who protects the hen house? Plus the Native tribes (whose lands the proposed project is located) object to the project. The fact Washington State is going forward is another case of white people bossing around native peoples for their economic benefit. Also please read the landmark report by the UN Intergovernmental Panel on Climate Change (IPCC) . We need to stop carbon emissions NOW. Tell me would you continue to smoke knowing you had cancer? Probably NOT. So let's not frack. It is reckless and crazy.

1880-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

SEIS is using outdated methane global warming potential value. They are using 2007 instead of 2016 values. 2016 value is now 32 which makes LNG plant emissions higher.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Brooke Kavanagh Email: brookellk@yahoo.com
Address: 2735 NE 47th Ave, Portland, OR 97213

By completing this comment card you agree to receive updates about the project.

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The production, processing, storage, transmission and distribution of fracked gas leaks massive amounts of methane into the atmosphere. When accounting for methane leaks, fracked gas has climate impacts similar to coal.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: BROOKE KAVANAGH Email: brookellk@yahoo.com

Address: 2735 NE 47TH AVE PORTLAND OR 97213

By completing this comment card you agree to receive updates about the project.

1882-1 13. LCA Inputs and Assumptions - Natural Gas Source

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Analysis does not incorporate diesel emissions for transporting sand and water to source fracking wells. The SEIS must include these GHG emissions.

_____(Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: BROOKE KAVANAGH Email: brookellk@yahoo.com

Address: 2735 NE 47TH AVE, PORTLAND OR 97213

By signing this comment card you agree to receive updates about the project.

1883-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

mix drastically in the next 12 years to avoid climate catastrophe. The SEIS needs to be using a relevant short-term time frame of 20 years, which would make the LNG plant 50% dirtier.

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The SEIS should be using the 20-year GWP of methane NOT the 100 year GWP. This is because of methane's potency in the short term. Given the IPCC dire warning that we must change our energy fuel ⇒ (Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Kathryn Kavanagh Email: KateKavanagh@hotmail.com

Address: 2735 NE 47th Ave, Portland Oregon 97213

By signing this comment card you agree to receive updates about the project.

1529-1 3. Outside of SEIS Scope

From: M Keely
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 11:58:53 AM

Name: M Keely
Email: Mkeely2000@gmail.com
Address: 3102 green mountain rd -
Jalama, Washington 98625

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Fracked Methane AKA natural gas has & does contribute to poor health. I got asthma In my late twenties while living in Tacoma. I've been told my work and residence are big contributors. Looking into this asthma rates have skyrocketed since the industrial revolution In the proximity of work or living quarters.
Please for the quality of health of the people, plants, animals and Mother Earth, Please say No to Tacoma LNG.

1367-1 22. General Opposition

From: Eileen Kegel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 9:07:54 AM

Name: Eileen Kegel
Email: bknee123@gmail.com
Address: 320 E Dock St, po box 209 - apt #2
WESTPORT, Washington 98595

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

we have a right to a clean environment...your plans to frack gas are now conducive to a clean environment. I hereby protest and declare my objections to making our area another nightmare, like Oklahoma...we have enough worries about earthquakes,,etc. this will only exaserbate that worry and could trigger a cataclismic event...do you want that on your conscience...if you have one....NO NO NO FRAKING bottom line ...WE CAN DO BETTER>>>THERE ARE BETTER ANSWERS>>>STOP THIS INSanity

2233-1 22. General Opposition

From: Lisa Ann Kelly & Family
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Sunday, October 28, 2018 10:37:07 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Do you recall when Santa Barbara County fought the installation of an LNG plant at Pt. Concepcion? It was decades ago, but nothing has changed since then to make LNG any less volatile or safer for our environment.

Please say "No" to fracked gas in Tacoma, WA.

Thank you.

Sincerely,

The Kelly Family (five of us):

Lisa Ann
Chad
George
Geoffrey and
Tristan
1724 Olive Avenue
Santa Barbara, CA 93101

Lisa Ann Kelly & Family
bluesunflowersb@gmail.com
1724 Olive Avenue
Santa Barbara, California 93101

From:	Nicole Kemena
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Monday, October 29, 2018 7:30:40 PM

Name: Nicole Kemena
Email: drkemena@gmail.com
Address: 7844 SW Ashford Street -
Portland, Oregon 97224

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puget Sound Clean Air Agency should go back to the drawing board. The draft SEIS does not account for the full climate impacts of fracked gas. The analysis is incredibly flawed and unacceptable, and we need the Air Agency to do better before they decide on the air permit for the facility.

Puyallup Rights and Justice

1. The proposed project is a direct affront to the Puyallup Tribe, putting their treaty rights and community at risk
first and worst.
2. Treaty rights have more authority than the right of any other governing body or agency. The Medicine Creek
Treaty is the supreme law of the land and has been violated throughout the process for this facility.
3. I stand with the Puyallup in opposition to the LNG facility. The Puget Sound Clean Air Agency and all
agencies involved in permitting this facility still need to consult with the Puyallup Tribe.

Climate Impacts of Gas

1. Although fracked gas produces less carbon emissions than coal when burned, the production, processing, storage, transmission, and distribution of fracked gas leaks into the atmosphere immense amounts of methane, which is a much more destructive pollutant for our climate than carbon dioxide. When accounting for methane leaks, fracked gas has climate impacts that rival those of coal.
2. LNG does not arrive in Washington carbon neutral. When methane is leaked directly into the atmosphere, it is 87 times more powerful at trapping heat than carbon dioxide when its impact is averaged over a 20-year period.
3. PSE's LNG facility, is precedent setting on how we deal with gas in Washington state. Analysis should assume a 3 percent overall leakage rate of methane. This modest standard reflects the global average leak rate, and is conservative in light of high average leak rates in the West and the additional losses that occur within distribution systems or at end-use facilities.
4. An overall 3 percent leakage rate should be applied unless PSE can provide clear evidence that the leakage rate associated with its proposed LNG project is, in fact, below this 3 percent standard. The burden of proof for adopting a project-specific standard should be on the project proponent, because the gas industry is the keeper of all crucial information about leakage rates.

Environmental Justice

1481-4 5. Regulatory Framework
1481-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
1481-4 21. LCA Inputs and Assumptions - Additional Air Pollutants
1481-4 3. Outside of SEIS Scope
1481-5 14. LCA Inputs and Assumptions - Leakage/Slippage

1. At public information meetings in 2017, the Air Agency shared that the facility would release ammonia,
arsenic, cadmium, hydrogen sulfide, and sulfur dioxide. LNG facilities have been shown to threaten human
health by significantly degrading air quality and contributing to health-harming pollution. The proposed
emissions units in this facility include an enclosed ground flare and vaporizer unit that would emit volatile
organic compounds (VOCs). VOCs include a chemical complex that has been linked to birth defects, shown to
cause cancer, and negatively affect the nervous system.
2. The communities being most impacted by the dangers of LNG, from the extraction site to the end location
are most often low income, communities of color; and most often indigenous communities as seen here in
Tacoma with the Puyallup Tribe and in B.C. the numerous First Nations suffering the consequences of
fracking.
Facility has 40-year plan, despite dire climate crisis
1. The IPCC reports that we need to change our fuel mix immediately in the next 12 years, or face dire consequences. The best available science on methane emissions must be used here if we are serious about combating climate change. This project would exacerbate the crisis we are in, locking Washington into gas infrastructure we do not need. Moreover, there is the potential that the facility itself will be impacted by rising sea levels due to climate change at the Port of Tacoma.

1945-1 23. General Support

From: Charles Kendig
To: Public Comment
Subject: 11-1-18 Ltr to PSCAA
Date: Thursday, November 1, 2018 4:49:18 PM
Attachments: 11-1-18 Ltr to PSCAA.doc

Good afternoon, attached please find my comment on the TOTE Maritime Alaska CNG project.

Thank you

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HONDA

American Honda Motor Co., Inc.
1919 Torrance Blvd.
Torrance CA 90501-2746
Phone (310) 783-2000

November 1, 2018

Puget Sound Clean Air Agency (PSCAA)
Attn: Public Comment
1904 3rd Ave Suite 105
Seattle, WA 98101

Subject: TOTE MARITIME ALASKA LNG PROJECT

Good afternoon,

I am writing as the head of logistics at Honda, longtime partners with TOTE Maritime. We have followed with great anticipation TOTE's conversion to LNG as it aligns very closely with our corporate initiative to leave the world better than we find it today (our "Blue Skies for Our Children" initiative).

I lead the teams responsible for shipping automobiles from factories around the world to our dealerships in the U.S. As you can imagine this activity creates a significant carbon / GHG footprint, which we are striving to reduce. We do this by collaborating with likeminded Ocean Carriers, Railroads and Trucking Partners who are proactively seeking to reduce the carbon footprint and GHG emissions related to their trade.

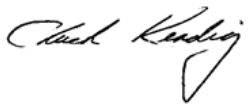
I was concerned to hear of delays in TOTE Maritime's conversion plan when I last inquired. It seems as though the environmental review has taken on a life of its own and has gone on far too long already. I have seen this happen in other regions to the detriment of the Port's competitiveness and ability to serve the growing demand of shippers (like Honda) for clean air alternatives. Further delay puts the port of Tacoma (in my opinion) at a competitive dis-advantage while continuing to un-necessarily pollute our environment. As I understand them, the benefits of this conversion are quite clear:

- Nearly 14% reduction in GHG
- The practical elimination of particulate emissions
- 100% reduction in SOX
- 90% reduction in Nitrogen Oxides

We can all be proud of these outcomes. As a company concerned with the environment we leave our children and grandchildren, I felt it important to express my concern regarding the delays and urge you to move swiftly forward with the approvals necessary to enable TOTE's LNG conversion plan.

Sincerely,

AMERICAN HONDA MOTOR CO., INC.



Chuck Kendig
AVP Automobile Operations / Logistics

1563-1 22. General Opposition

From: INF Flux
To: Public Comment
Subject: EIS
Date: Thursday, October 11, 2018 4:53:37 AM

I have no confidence in the validity of any EIS prepared based off the shady practices and assurances of PSE, while their pipeline is in the process of exploding as we speak.
If you care about Tacoma, and would like to restore public trust in government.
Stop this project. It's dangerous, dirty, and unwanted.
Sincerely
John Kennedy US Army Ret.
Voter.

0343-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0343-2 14. LCA Inputs and Assumptions - Leakage/Slippage

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

Pam Keeffe
5149 Evergreen Way #153
Everett, WA 98203

PSCAA:

Please Re-do the DSEIS TO ACCOMMODATE a shorter lifespan of the project - 20 years.

Fracked gas is not as clean as described as methane leaks are obiquitous AND CARBON used in TRANSporting ~~GAND~~ + water is not -

Methane will leak From the PLANT itself AS IS the ships! - Do over!

Pam Keeffe

1767-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:45:21 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Hello sweet fellow beings of Earth,
I am so terrified as I watch the collapse of our biome and the 6th mass extinction of recorded life on this planet that I fear will be our last. I am so terrified for me, my loved ones, and you and your loved ones. And every other creature and plant here. We are so vulnerable to our atmospheric conditions. These terrible fires and the deadly heat waves to come are directly related to the increased solar insolation of our planet caused by the increase in the green house gases in our atmosphere. We are going to asphixiate. You, me, every child, every elderly person. Rich, poor. We will all starve in this inhabitable planet. The suffering will be endless until it takes us all. You cannot do this. Do not pass this. The bribes are not worth the suffering. Please look into activism in your voting base that stems from the urgent need to save humanity. Please. Please don't kill me for your families money.

Sincerely,

Leah Ketilsson
leah.ketilsson@gmail.com
98248

1674-0 23. General Support

From: Maaliki, Khaled
To: Public Comment
Subject: Puget Sound Energy's (PSE) liquefied Natural Gas (LNG) Facility
Date: Monday, November 19, 2018 10:02:22 AM

Hello,

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Based on draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) on October 8, 2018, I encourage the agency to issue the necessary permits for the project to proceed.

We all need to be good stewards of environment and make responsible decisions at local, state and federal levels. All the information reviewed thus far regarding this project gives me confidence that proceeding with the project is the responsible thing to do for the community and overall environment. LNG is a cleaner fuel than Diesel so PSCAA needs to act appropriately and support PSE in making this project a success.

Sincerely,
Khaled,

This transmission is CONFIDENTIAL and the information is intended only for the use of the individual or entity to whom it is addressed. If you are not the intended recipient, or the employee or agent responsible for delivering it to the intended recipient, you are hereby notified that any use, dissemination, distribution or copying of this communication is STRICTLY PROHIBITED. If you have received the transmission in error, please immediately notify us by e-mail and/or telephone, and delete the transmission and any attachments from your mailbox. Thank you

1762-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 3:14:56 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I live here and work here. Protect our lives and protect Puget Sound.

Sincerely,

Lynae Kibiger
lkibiger@gmail.com
98371

Carole: Thank you. Marilyn Kimmerling?

Marilyn: Good afternoon. My name is Marilyn Kimmerling. When I heard that the Puget Sound Clean Air Agency was going to insist on a new supplemental environmental impact study, I was so thrilled.

[02:06:00] And we waited and we waited, until the results were available. And then, I looked at them. Tisk, tisk, tisk. So, I'm disappointed, as are a lot of other people. I'm going to keep this as brief as I can. I understand that the purview of the Puget Sound Clean Air Agency is on comments on the air quality. But first, I have to say the Puyallup – well, this whole plan is illegal. It's illegal because the Puyallup Nation, which is a sovereign nation, was never consulted in the process. It violates their treaty rights. And it ignored them. As their treaty rights were established in the 1854 Medicine Creek Treaty, which is still a working document.

So, it's illegal. Now, let's go on to air quality. First of all, the data that PSCAA used in this study is outdated. They used a 2007 study.

[02:07:00] Why not the 2016 study? Why 100 year study instead of a 20 year study, when we know that the issues on climate change have become an emergency, and we really only have 12 years to get it together? My previous lifetime, I was a mental health counselor. And even at that point, some of the children that I worked with actually said to me will I get a chance to grow up because they were concerned about climate change. When you look into the eyes of a child that has that kind of concern and fear, you have to take it seriously. Earlier this month, in October, earlier this month, there was a big trash and metal and battery fire right in the Port of Tacoma.

I was walking my dog in the woods many miles away at Point Defiance Park, and we could not breathe.

[02:08:02] Also, they said that the Titanic was unsinkable. It was perfectly safe. There can't be an accident here with a 3,000 degree fire that would ensue. But we all know that the unthinkable does occur, and accidents do happen. We have to take a look at health impacts, due to reduced air quality, too.

Carole: Could you try to wrap it up in a few seconds?

Marilyn: Yeah. Benzene causes brain cancer. There are parts of that study

1184-1 5. Regulatory Framework
1184-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

that were not done, looking at particulate matter. Tacoma already has a worse health outcome as determined by the Health Department because of our history of heavy industrial businesses. And now, we're going to bring another one in. We deserve better. We are not a sacrifice zone.

[02:09:00] You must order a more complete supplemental environmental study, and you must delay until you have that study and people have a chance to have full comment. Thank you.

0467-4 22. General Opposition
0467-4 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0467-4 13. LCA Inputs and Assumptions - Natural Gas Source
0467-4 11. LCA Inputs and Assumptions - General

Dear Puget Sound Clean Air Agency,

As a resident of Tacoma, I am appalled that the SEIS did not include diesel emissions from trucks moving water & sand to and from fracking wells to and from fracking wells, both in B.C. & in the U.S. There is no guarantee that all fracked gas will be piped in from British Columbia. The SEIS further assumes that PSE will have additional maritime customers, with No factual basis. You cannot put assumptions into a "Fact" based statement hoping that they will become true sometime in the foreseeable future. This is not a wishlist. I wish for clean air and a future for my grandchildrens grandchildren. Please take the time & energy to address these issues

Please include this in the final supplemental environmental impact statement.

Name: Carol Kindt	Phone: 253-576-5248
Address: 5939 N. 26th St, Apt 100 Tacoma, WA 98407	Email: carol@350tacoma.org

0468-2 3. Outside of SEIS Scope
0468-2 22. General Opposition

Dear Puget Sound Clean Air Agency,

As a member of 350 Tacoma, I recognize that we have already exceeded the "Safe" air quality. We are in a climate crisis, with the UN IPCC statement of August 8, 2018 explicitly stating that we have less than 12 years to mitigate this, or face dire consequences. My concern is that we as citizens & residents of Tacoma & the Salish Sea, are being ignored while the monied interests of PSE, continues to ignore the facts of the fracked gas cycle & the SEIS has not sufficiently addressed the total air emissions from this process. I ask that PSCAA hire a firm that is independent of the consultation of the original, defective FEIS, to present all of the facts, with the best available science. I further ask that PSCAA ultimately deny an air quality permit to this project. It is not needed.

Please include this in the final supplemental environmental impact statement.

Name: Carol Kindt	Phone: 253-576-5248
Address: 5939 N. 26th St, Apt 100 Tacoma WA 98407	Email: carolkindt@msn.com

0469-2 22. General Opposition
0469-2 5. Regulatory Framework

Dear Puget Sound Clean Air Agency,

I am a retired attorney who has, in the pursuit of researching this particular LNG project, developed an intimate & rewarding relationship with members of the Puyallup Tribe of Indians. As such, my value system rejects outright the greenhouse gas emissions which extremely adversely contribute to climate crisis, and have historically violated the fishing rights & living conditions of their raped homeland. My concern is that the monied & shortsighted interests of PSE will continue to deteriorate & destroy the already contaminated Port of Tacoma & greater Salish Sea. My ask is that PSCAA prepare an additional SEIS, reflecting the best science available, & then provide an additional comment period, based on facts & not theoretical scenarios. Hopefully an accurate SEIS will prove that the LNG project is untenable to sustaining our environment, both for our tribal neighbors, but for future generations of all human & animal life.

Please include this in the final supplemental environmental impact statement.

Name: Carol Kindt	Phone: 253-572-5248
Address: 5939 N. 26th St, Apt 100 Tacoma, WA 98407	Email: carolkindt@msn.com

0760-1 11. LCA Inputs and Assumptions - General
0760-2 5. Regulatory Framework
0760-3 19. LCA Inputs and Assumptions - End Use
0760-4 13. LCA Inputs and Assumptions - Natural Gas Source

October 31, 2018

RECEIVED
NOV 15 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101

Re: Public Comment for PSE LNG Draft SEIS

After attending both sessions of the oral public comment hearing at the Rialto Theater on October 30, 2018, I feel the need to expand upon my opposition to the draft SEIS in particular and the LNG refinery in general.

You heard early in the afternoon the unequivocal opposition by Annette Bryan, a Puyallup Tribal council member, who represented the Puyallup Tribe as a whole. You heard her state quite clearly that PSE never meaningfully consulted the tribe, much less invited representatives to the table as a peer government and a sovereign entity prior to the original EIS.

You heard multiple testifiers from the scientific community raise multiple questions and statements in opposition to the draft SEIS presented for comment. Those statements made clear that the draft SEIS was incomplete and inconsistent at best. It was based on outdated science (albeit within the current state regulations), and assumed facts not in evidence (i.e., nonexistent shipping customers and a sole source of the fracked methane gas from British Columbia).

It drew upon erroneous calculations, and it depended upon spoon fed data supplied by Puget Sound Energy, and not a neutral third party with no interest in securing an air emissions permit. PSCAA had stated at the onset of its SEIS that it was going to examine both upstream and downstream emissions (or "womb to tomb"). It has also stated that it was going to entertain comments pertaining only to the SEIS and its obligation to examine the air quality in its analysis of whether the SEIS sufficiently addressed this issue.

As was made clear by the consistent testimony of people who studied the SEIS most thoroughly (given that it was often convoluted and incomplete in its analysis), no such assurances were made using the best available science for methane emissions. Further, "facts" were presented using presumed "customers" of liquid natural gas, and not the single current contracted customer, TOTE. PSE itself has presented power point presentations reflecting that the "peak" energy needs of its customer base has actually DECREASED (latest data 2017). I personally attended a meeting in Bellevue where that was explicitly graphed on a power point slide.

The community of faith further questioned the social impact of climate change which is being rapidly accelerated by the continued dependence on fossil fuel extraction, as did

representatives of the Missing and Murdered Indigenous Women coalition. They provided solid statistics on that sordid and tragic element of the fracking sites. We pretend that it doesn't affect us, as we have no fracking sites within Washington State, and yet the SEIS itself reflects that all of the methane gas provided to PSE would be piped down from its fracking sources in British Columbia (in itself a false and misleading statement regarding the source(s) of all of the methane gas).

The medical and healthcare community gave testimony regarding the medical implications of climate change, specifically conditions such as asthma and diseases including multiple types of cancer directly related to CO^2 and methane, which is 86 times deadlier as a heat trapping gas in a 20-year period of time. This testimony, as well as the testimony of the above referenced parties, repeatedly cited the Intergovernmental Panel on Climate Change (IPCC), which unequivocally stated that this planet has (less than) 12 years to mitigate the rapid increase of the climate worldwide or face dire consequences as a species.

First hand anecdotal testimony was given about experiencing both the effects of the massive forest fires from British Columbia for the second year in a row, as well as the acrid smoke arising from the spontaneous combustion of lithium batteries in a scrap metal dump in the tideflats in mid-September 2018. This smoke didn't just rise over the Port of Tacoma, but as air does, it spread out throughout the city.

That smoke also directly impacted the people being detained within the ICE detention center on the tideflats, where they are housed on land which is EPA designated Superfund landfill.

It is directly germane to an air quality issue, which PSCAA is bound by its authority to be limited to in the scope of its decision. It must therefore, be included when there are human beings who have no remedy but to shelter in place in the event of a major gas leak or catastrophic natural disaster or manmade "accident." These are not made up assumptions. These are real humans, in real time, who will be the first to be adversely affected as they have no evacuation available to them in a worst-case scenario.

In contrast, and I acknowledge bias on my part, the only opposition I heard to denying this air quality permit based on the incomplete and inaccurate SEIS was made by industry representatives, specifically PSE and TOTE, and by labor union representatives. The PSE and TOTE voices I understand, although I disagree with their assessments. In fact, no heavy oil bunkering occurs by TOTE within the Port of Tacoma, as the two ships plug in to electricity.

The labor voices also gave misleading information, specifically that this LNG refinery and export terminal would provide long-term employment at "family" wage jobs. This is simply untrue. When construction is completed (and it is 90% complete absent the air

0760-4 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
0760-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
0760-6 3. Outside of SEIS Scope
0760-7 3. Outside of SEIS Scope

0760-7 cont'd 3. Outside of SEIS Scope

permit), it will provide at most 17 full time jobs. This is not an exaggeration. The jobs have been in the construction process, not the maintenance of the plant. For a tank which will be filled with 8 million gallons of frozen methane gas, it is incomprehensible that there will be so few jobs to ensure that that gas does not leak, expand or explode, but those are the facts as presented by PSE itself.

The SEIS must be amended to include both the most recent science available, as well as the real customers and need, and not theoretical facts not in evidence. It cannot be formulated using charts, power points, and narrative provided by the company which would be most benefitted by a positive assessment.

In the two weeks since I first started this letter, California has been inundated with wildfires fires of unprecedented scope and intensity. It is November. There is no more "fire season". Firefighters themselves are saying this. It is now a year-round situation with no relief in the foreseeable future. Fire eats up air. It is incontrovertible that climate warming has been a primary factor in this phenomenon, and also irrefutable that this will not be reversed unless and until we, as the human force responsible for climate warming, begin to address it from a viewpoint other than the potential for profit. Money does not buy air. To ignore that fact is to ensure that we will die from lack of air.

Sincerely,

Carol M Kindt

Carol M. Kindt
350 Tacoma

[04:00:00]

Steve: Carol Kindt?

Carol: Good evening. My name is Carol Kindt. Thank you for the opportunity to let us all speak tonight. I'm going to take my moment to let us all be silent tonight. To listen to the voices of the ancestors who lived here long before we ever thought about being here. To listen to the voices of the unborn children, of these young women who may not have those children because of climate change. To listen to the voices of the orcas who are almost extinct who also breathe air. Take the moment and listen.

[04:01:00]

[04:02:00] Thank you.

Steve: So, before I call up the next speaker, the next group after that, I'll give you a heads up, it's David Phillips, Suzanne Greenburg, Valerie Peaphon, Jessica Zimmerle, and Reverend Jan Ruud. So, Nanette Reetz?

Nanette: Good evening. Thank you for taking our comments this evening.

[04:03:00] My name is Nanette Reetz, and I'm a member of Advocates for Cleaner Tacoma. We are a part of a coalition of 28 environmental, health, social justice groups who oppose this project. I would like to read off the coalition members that have signed on in just this last week. This coalition is growing.

They include Advocates for a Cleaner Tacoma, 350 Tacoma, Washington Physicians for Social Responsibility, Climate Scientist, Redefine Tacoma, Native Daily Network, Vashon Climate Action Group, Climate Action Bainbridge, Protectors of the Salish Sea, Mozisca Talks, Missing and Murdered Indigenous Women and Girls' Collaborative, Civic Actions for the Salish Sea, Stop Fracked Gas PDX, Direct Action Tacoma, 350 East Side, Sierra Club Washington Chapter, 350 Seattle, Oregon Physicians for Social Responsibility, Earth Ministries, and Washington's Interfaith Power and Light, The Conversation, Legal Rights of the Salish Sea, Cascadia Wildlands, Rogue Climate, Stand Up Earth, Plant for the Planet Seattle, Green Peace USA, Climate Action Coalition, Mosquito Fleet, and the Northwest Detention Center Resistance.

[04:04:28] This coalition, as I said, is growing. And we would like to state that we, incorporate by reference, the comments of the Puyallup Tribe. Please do the right thing. Thank you.

1568-1 6. Purpose and Need

From: Betsy Wheelock
To: Public Comment
Subject: FW:
Date: Tuesday, November 13, 2018 2:10:22 PM

From: Carol Mangan Kindt [mailto:Carolkindt@msn.com]
Sent: Wednesday, October 24, 2018 3:33 PM
To: Betsy Wheelock
Subject:

Draft SEIS – open for public comment through November 21, 2018

Sent from Mail for Windows 10
It is completely ironic to me as an individual, and as a member of 350 Tacoma, a grassroots group committed to combatting the adverse affects of rapid global warming, that Puget Sound Energy's own website stated that its gas sources for the Tacoma LNG facility would be from multiple locations. It was only after the draft SEIS was released that Puget Sound Energy changed their own narrative to claim that the only source of its fracked gas for the Tacoma LNG facility would be from British Columbia. PSE has a history of changing the "facts" and its own narrative to meet the requirements of any agency granting a permit. When they don't get one through a streamlined and unexamined process, they continue to build anyway, assured that in the end they will be issued whatever permit they need to put this dangerous and unnecessary refinery online.

Their misleading claims, especially to the public, are a red flag. They are duplicitous in their business practices. Their own data reflects that the need for "natural" gas to meet "peak" periods of use has actually decreased in the last 10 years. They can no longer use that claim to rationalize the need for the LNG facility. Now PSCAA assists them in misleading the public by including phantom maritime customers which do not, in fact, exist as of the date of the release of the draft SEIS. Do not issue a permit based on assumptions.

We, as inhabitants of this planet, have less than 12 years to radically mitigate the harm already experienced on our planet by global warming. Do not let a "bridge fuel" dependent on fracked methane accelerate this dire scenario. LNG is a bridge to nowhere. It will be a bridge to certain death, far worse than coal in a 20-year cycle. We don't even have 20 years. We are in crisis now. Please, as the agency tasked with protecting the air we breathe, deny the permit.

1677-1 22. General Opposition
1677-2 19. LCA Inputs and Assumptions - End Use

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:41:48 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

After analyzing the SEIS presented by PSCAA, it is obvious that this needs to be redone, using the best available science and the real customers PSE has lined up, in real time. Last night I heard a PSE representative tell the West End Neighborhood Council in Tacoma tell the audience that the LNG stored in Tacoma would also be used for vehicle (trucks) fuel. That proposal was never included in either the original EIS, which he said was an FEIS, approved by the City of Tacoma as lead CEPA agency, or in the SEIS, as requested by PSCAA. What other lies are they going to tell the public while this process is being reviewed?

Sincerely,

Carol Kindt
carol@350tacoma.org
98407

1744-1 1. Determination of SEIS Scope - Comparison to FEIS

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 7:44:08 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The SEIS prepared for PSCAA must be revised to reflect not only the best available science, the real sources of fracked methane gas that will be piped into the LNG facility in Tacoma (because PSE lies about it only being piped from British Columbia), and real customers, not made-up, theoretical customers. Most recently (Wednesday, November 14, 2018) a PSE spokesperson told the West End Neighborhood Council that the LNG would be used for vehicle transportation (i.e., trucks that now run on diesel fuel). This was the first time I heard that particular lie. That statement was not included in either the original EIS approved by the Tacoma City Council, nor in this SEIS. The lies continue to suit the needs of PSE. This is totally unacceptable.

Sincerely,

Carol Kindt
carol@350tacoma.org
98407

1752-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 11:23:43 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Carol Kindt
carol@350tacoma.org
98407

1771-1 1. Determination of SEIS Scope - Comparison to FEIS

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 4:59:50 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

By now, you're probably sick of reading all of the thousands of comments in opposition to the PSE LNG facility and the defective SEIS on the air quality from the origin of the fracking site(s) in British Columbia and other places, to the delivery site in Tacoma, Washington. If you will just pay attention to the science which has been offered (not by the consulting firm but by independent sources), the fact that theoretical and not real customers were included in the SEIS for the distribution of the liquid natural gas, the fact that PSE as recently as last week at a West End Neighborhood Council meeting in Tacoma stated that the LNG would also be used as a fuel for diesel trucks in the tideflats (which fact has never, ever been discussed either in the original FEIS nor in the SEIS requested by PSCAA, or any number of other issues not addressed in the SEIS, you must come to the conclusion that another, new SEIS needs to be researched and written by an independent consulting firm which has not previously been used to promote this project.

Sincerely,

Carol Kindt
carol@350tacoma.org
98407

From: JOANA KIRCHHOFF
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:19 PM

Name: JOANA KIRCHHOFF
Email: joanakirchhoff@gmail.com
Address: 3414 NE 73rd Ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop any process concerning the development of an LNG facility near Tacoma. The Puyallup Tribe has spoken against the site and have been supported in several actions by citizens concerned about the degradation of the site.

On a global level any further development of fossil fuels infrastructure is contributes to global warming and climate change. STOP NOW and put money and energy in alternative fuels

Thank you,
Joana Kirchhoff

1396-1 22. General Opposition

From: JOANA KIRCHHOFF
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:05 PM

Name: JOANA KIRCHHOFF
Email: joanakirchhoff@gmail.com
Address: 3414 NE 73rd Ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop any process concerning the development of an LNG facility near Tacoma. The Puyallup Tribe has spoken against the site and have been supported in several actions by citizens concerned about the degradation of the site.

On a global level any further development of fossil fuels infrastructure is contributes to global warming and climate change. STOP NOW and put money and energy in alternative fuels

Thank you,
Joana Kirchhoff

1404-1 22. General Opposition

From: JOANA KIRCHHOFF
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:56 PM

Name: JOANA KIRCHHOFF
Email: joanakirchhoff@gmail.com
Address: 3414 NE 73rd Ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop any process concerning the development of an LNG facility near Tacoma. The Puyallup Tribe has spoken against the site and have been supported in several actions by citizens concerned about the degradation of the site.

On a global level any further development of fossil fuels infrastructure is contributes to global warming and climate change. STOP NOW and put money and energy in alternative fuels

Thank you,
Joana Kirchhoff

1423-1 22. General Opposition

From: JOANA KIRCHHOFF
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:40 PM

Name: JOANA KIRCHHOFF
Email: joanakirchhoff@gmail.com
Address: 3414 NE 73rd Ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop any process concerning the development of an LNG facility near Tacoma. The Puyallup Tribe has spoken against the site and have been supported in several actions by citizens concerned about the degradation of the site.

On a global level any further development of fossil fuels infrastructure is contributes to global warming and climate change. STOP NOW and put money and energy in alternative fuels

Thank you,
Joana Kirchhoff

1429-1 22. General Opposition

From: JOANA KIRCHHOFF
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 10:32:53 AM

Name: JOANA KIRCHHOFF
Email: joanakirchhoff@gmail.com
Address: 3414 NE 73rd Ave -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop any process concerning the development of an LNG facility near Tacoma. The Puyallup Tribe has spoken against the site and have been supported in several actions by citizens concerned about the degradation of the site.

On a global level any further development of fossil fuels infrastructure is contributes to global warming and climate change. STOP NOW and put money and energy in alternative fuels

Thank you,
Joana Kirchhoff

2215-1 22. General Opposition
2215-2 7. SEPA Alternatives

From: karinkirk@everyactioncustom.com on behalf of Karin Kirk
To: Public Comment
Subject: I"m against the Tacoma LNG Project
Date: Tuesday, October 23, 2018 7:45:28 AM

Dear Responsible Official,

I'm a geologist and I've been either studying or working on climate change since 1989. We've known about this problem for 30 years. We've also known the solution, all along.

We've done almost nothing to solve the problem, and we've squandered the buffer of time we had for a gradual transition away from fossil fuels.

Now, we have little choice. We've tied our own hands. The choice has to be this: no new fossil fuel infrastructure. No new fossil fuel development, no new fossil fuel anything.

Fossil fuels have a direct, negative impact on public health, and air pollution from fossil fuels cause the premature deaths of tens of thousands of Americans every year. Thousands more suffer from asthma and other illnesses from air pollution.

The health care bill for these illnesses is borne by the public, not the fossil fuel companies, nor the utilities that put fossil fuel projects in place. It is an enormous public subsidy for fossil fuel use, and it should be tallied in the actual costs of fossil fuel. When you consider the damage caused by dirty energy sources, they are economically untenable.

Fracked natural gas also emits methane, which packs a mean punch in terms of heat-retention in the atmosphere. We simply can't afford to commit to a whole new fossil fuel project. The time to unequivocally move away from these polluting fuels is right now.

Please say no to this LNG project, and focus instead on addressing climate change, protecting public health, and steering Washington toward clean and sustainable energy.

Specifically, the “no-action alternative” should be revised to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency. That is exactly the direction in which we need to go - we no longer have time to waste.

Thank you for your consideration.

Sincerely,
Karin Kirk
Bozeman, MT 59715
karinkirk@gmail.com

1969-1 23. General Support

From: Constance Kirkpatrick
To: Public Comment
Subject: LNG plant at Tacoma Port - HIGHLY SUPPORT
Date: Friday, November 2, 2018 11:35:45 AM

Hello, thanks for this opportunity - as a citizen of Steilacoom, I'm very supportive of this progressive step away from the diesel and dirty energy usage of big ships in Tacoma. Please stay the course to transform ourselves into the next environmental progress: LNG. Of course, in the future, something better will come along, but we shouldn't miss this opportunity to improve. Thanks again, Connie Kirkpatrick

From:	Jim Klein
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, November 20, 2018 8:17:40 PM

Name: Jim Klein
Email: JKLEINPDX@GMAIL.COM
Address: 3100 NE 36TH AVE -
PORTLAND, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear fellow Breathing Human Beings & fellow Neighbors of the Pacific NW,

I urge you to go outside and take a big deep breath ... and as you do ...please appreciate the fact that you still Can!

2 Reasons WHY to NOT Support the LNG Proposal:

1st Emotional:

"Tacoma" comes from the [Native American] name..., Tacopid, meaning "She who gives us the waters."
....I add: Tacoma is NOT the 'One who gives GAS'... JDK 11/14/18

1st reference from: walkingtacoma.blogspot.com/2005/07/meaning-of-tacoma.html

... as referenced from:
nativeamericannetroots.net/diary/1465

Tacoma: the Salish-speaking Indians in the area referred to it as Shubahlup which means “the sheltered place.”
American settlers later named it Tacoma which is supposedly from Takohoma which has been reported to mean “frozen waters,” or “nourishing breast,” or “near to heaven” which may refer to the nearby Mt. Rainier.

2nd Logical Reason below:

I understand you will act with your heart & mind, supported by research, to evaluate and vote in a way that is right for our current fellow citizens the world over. Towards this end, question all that you know about our current Climate situation. We are far worse off than most individuals know or realize. As recently reported internationally, OUR (CURRENT & FUTURE GENERATIONS IF YOU CARE AT ALL) ... EARTH's Carbon numbers in the atmosphere have been under estimated and accounted for ... to the extent that we must ACT now to focus exclusively on truly GREEN non-Carbon Emission Energy producing options in the next 2 to 5 years. What this means is DON'T Trust the "Natural Gas" drilling & distribution Companies' message that Gas from the Earth will reduce overall Carbon Footprint,

1516-1 22. General Opposition

It will not. It is mis represented as NATURAL.
It's marketing 101. They the companies have been wrong before and they are wrong here. THE life-Cycle of Extraction, formulation, Distribution & use are all CARBON Releasing steps. The overall FOOTPRINT or GAS PRINT or LIFE PRINT is DEADLY for us now ... and FOR our CHILDREN'S CHILDREN or
FOR our NIECES & NEPHEWS Children's Children!

Stop, Go Out side, Breath IN, Care, Act & Vote to RE-DIRECT to Truly NON-Carbon Emitting sources to GREEN Power our Future. Please GO Buy Stock in SOLAR or WIND or WAVE or just help someone get a GREEN JOB! Don't be distracted by the SHORT TERM FALSE HOPE - GO forward for a GREEN WIN!

"Make Tacoma the Green to Seattle's Blue!" ... JDK 11/14/18

Sincerely, not for me cause I'm 54 but for the Future fellow Breathing HUMAN BEINGS.
Thank you for reading,
Jim Klein
PAC NW Air Breather
SW WASHINGTON

Please Act ... as the rest of the "band plays on" - let's redirect to TRUE GREEN! not FAKE GAS Green!

2016-1 23. General Support

From: My Klob
To: Public Comment
Subject: Tacoma LNG
Date: Thursday, November 1, 2018 9:25:06 AM

It makes me fearful for the future of humanity to think that a project that replaced bunker fuel (an environmental nightmare) with LNG would obtain opposition.

Boats don't move because of wishes or dreams. Idealism won't beam cargo to Alaska.

Nothing is perfect. Solar panels have heavy metals.

LNG is the cleanest fuel for large tankers.

People can't just say no. They need a cleaner alternatives. Saying no won't cause a cleaner future, it will return us to a dirtier past.

There is no question that burning LNG is better for the environment than burning bunker fuel. To imply that that question has not been resolved is a lie and manipulates well-intentioned stupid people. It is evil.

From: Dave Knutzen
To: Public Comment
Subject: TOTE Marine LNG facility - Public Comment
Date: Wednesday, November 21, 2018 6:17:24 PM

Thank you for the opportunity to voice my opinion of SUPPORT for TOTE's desire to convert to LNG and the needed approval for the LNG storage facility.

My name is David Knutzen and I am the CEO of Northwest Marine Technology (NMT). Prior to working for NMT, I was a biologist with the Washington Department of Fish and Wildlife and have since been a member of various management committees. NMT is a small fish tagging business located in northern Puget Sound. NMT has been instrumental in the application of marking and tagging salmon in order to collect data to aid management in making sound scientific decisions. Having the applicable data is key to increasing ones confidence in the management process.

Puget Sound and the beautiful Pacific Northwest are in trouble. From critically low salmon populations to starving orcas I see it daily in my work and personal live. We are at a critical time where serious small and large scale change is necessary if we want to get ahead of this pending environmental crisis. People throughout Puget Sound are working to lower our environmental footprint in our daily lives. Businesses are encouraged to do the same. While things like converting to LED lighting, limiting our driving, or enhancing our recycling programs is very important it is equally important to recognize and encourage industries that can make bold steps in adopting greener practices. The shipping industry in Tacoma is at this step. Having traditionally diesel powered ships crossing Puget Sound convert to LNG is a significant milestone. Taking a bold step to reduce our emissions is a step for a greener future.

I work for a company that knows the power of data. Solid data that can demonstrate why it is important to make a specific decision. The emission reduction data for the diesel to LNG conversion is staggering. 100% reduction in sulfur emissions, nitric oxide and nitrogen dioxide emission reduction of 90% and carbon dioxide by 20% are something that needs to be supported. It is going to take generations to clean up our environment. TOTE converting to LNG is the type of change that is needed today and one that the Puget Sound Clean Air Authority and City of Tacoma should be proud to have done on their watch.

I would hope that PSCAA and the City of Tacoma reward TOTE for improving our air quality.

Thank you for time.

Dave Knutzen

David Knutzen
Northwest Marine Technology, Inc.
Office – 360-468-6431
Cell – 360-791-1320
www.nmt.us

1525-2 5. Regulatory Framework
1525-2 3. Outside of SEIS Scope

From: Evelyn Kochanowski
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:11:55 PM

Name: Evelyn Kochanowski
Email: yoevsko@yahoo.com
Address: 4613 ne killingsworth st - #4
Ptld, Oregon 97218

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The puget sound clean air agency's analysis is incredibly flawed an unacceptable concerning environmental impacts. The project is sited on tribal land without their consent. Safety issues are numerous building on tide flats. Please stop this project for the common good.

2184-1 3. Outside of SEIS Scope

From: 42sbkoelle@everyactioncustom.com on behalf of Spencer Koelle
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, October 24, 2018 1:03:32 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

I know how bad fracking is, because I live in a state where the tap water sometimes catches fire.

Sincerely,
Spencer Koelle
Philadelphia, PA 19143
42sbkoelle@gmail.com

2539-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2539-2 14. LCA Inputs and Assumptions - Leakage/Slippage
2539-3 7. SEPA Alternatives
2539-4 7. SEPA Alternatives

From: PierceCoVets@everyactioncustom.com on behalf of Cheryl Kopec
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 8:22:41 PM

Dear Responsible Official,

As an environmentally aware citizen and Tacoma resident, I am deeply concerned about the LNG tank proposed to be sited at the Port of Tacoma.

The project is touted as a way to meet stricter clean energy standards. However, most of the rhetoric supporting this view is centered on the environmental impact of the fuel as it is burned, and not on its impact during extraction, delivery, etc.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

Bearing in mind that your agency's stated goals, per your website, include a priority on climate change and GHG from the transportation sector. In light of this emphasis, I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the “no-action alternative” to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the “no-action alternative” to include the assumption that Tote Maritime will achieve a 50% GHG reduction, in line with the International Maritime Agency’s established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, ‘Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,’ Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Cheryl Kopec
Tacoma, WA 98408
PierceCoVets@gmail.com

1974-1 23. General Support

From: Dan Kovacich
To: Public Comment
Subject: Maxum letter for PSE LNG Facility
Date: Wednesday, October 24, 2018 5:48:21 PM
Attachments: PSCAA_Maxum PSE LNG 10.22.18.pdf

Good afternoon,

Please accept and acknowledge receipt of our letter in support of the PSE LNG Facility in Tacoma.

Best regards,

Dan Kovacich
Vice President
Marine Division

Maxum Petroleum
Pilot Thomas Logistics
206-613-1449 (D) | 206-817-3642 (C)
1711 13th Ave SW | Seattle, WA 98134

maxum PETROLEUM

Maxum Petroleum
7711 13th Avenue SW
Seattle, WA 98134
P 206.623.1430
F 206.623.0195
www.maxumpetroleum.com

October 22, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

RE: PSE LNG Project

To whom it may concern:

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Maxum Petroleum is a marine diesel fuel and lubricant provider. Locally, we have terminals on the water, barges, vessels and trucks that we use to distribute our products to tugs, vessels and ships throughout Puget Sound. Additionally, we have operations on the Columbia River, San Francisco/Oakland and LA/ Long Beach, which provide the same mode of distribution to the maritime community. Several of our clients are and have begun to transition their vessels propulsion system to operate on LNG due to the environmental and regulatory pressures outlined in this letter. The facility at Puget LNG is an important supply source for these vessels to receive the services they require to operate. This specifically includes my concurrence with the conclusion about the environmental benefit of replacing transportation bunker fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing bunker fuel currently used by the maritime industry with LNG fuel. Switching from bunker to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%. It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in.

It is also important to note that LNG powered ships will substantially exceed the North American Emission Control Area requirements established by the International Marine Organization's (IMO). The IMO regulations have required a reduction in the bunker fuel sulfur content from 3.5 percent to 0.5 percent. Both US EPA and the US Coast Guard are enforcing these fuel regulations, which have been estimated by EPA to reduce mortality by as much as 30,000 people per year. TOTE has made the commitment to use LNG fuel, which provides substantially greater benefits than even the IMO regulations mandate. Maxum Petroleum has assisted its clients that have already moved from bunker fuel to Ultra Low Sulfur diesel fuel over the last decade. In each case, the clients have placed their environmental stewardship programs at the forefront of their company's core values and have

remained not only competitive but also safe and efficient operators. These shipping lines as well as several others that call in Puget Sound are incorporating LNG propulsion systems into their new build programs. The future primary source of fuel for bunkering vessel is LNG.

Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

Sincerely,

Dan Kovacich
Vice President, Marine Division
Maxum Petroleum

1907-1 22. General Opposition

Name Emily Krafft

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

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NOV 19 2018
Puget Sound
Clean Air Agency

This project would lock our region into gas infrastructure we don't need — and would provide an obstacle to the necessary transition to renewable energy. The transition to renewable energy needs to be aggressive, and begin

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: EMILY KRAFFT Email: emily.krafft@gmail.com

Address: 1302 NE Mason St., Portland OR 97211

By completing this comment card you agree to receive updates about the project.

1836-1 22. General Opposition

From: Anne Kroeker
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 5:58:11 PM

Puget Sound Clean Air,

Dear Puget Sound Clean Air Agency,
There is no fossil fuel extraction that does not emit carbon, which is a long term pollutant, along with the production and transportation of, or for, fossil fuel energy, which creates immediate air and land pollution. Liquefied Natural Gas is a fossil fuel, based on its production and input. Neither private nor public ventures need to produce any more energy that is not devoid of all air, water and land pollution because our world is overburdened already with toxins, including carbon and its lethal byproducts. The IPCC has said our viewable future time for clean air at all, is decade limited.

Beyond the moral choice to not add more carbon to our environment, there is the opportunity now that the PSCAA commissioners have, to right the wrong of PSE building on land, which is first and foremost, traditional tribal land. Even more egregiously, PSE has already built this plant, without all the permits required, thus disallowing the process for either the Tribe to object before the project got started and for the rest of Tacoma, whose air is further threatened, to know what is happening.

Puget Sound Clean Air Agency Permit rules page:
https://www.pscleanair.org/177/Construction-Permits

“A permit is required of any new or modified air pollution source prior to construction or making modifications (including equipment, process, or design changes) that affect the level of air contaminants emitted. This permit is obtained through the Notice of Construction program.”

PSE has built this plant, off the “profits” of their ratepayers (who have no choice), without proper construction permits, on toxic landfill which is on traditional Puyallup waters (which tribe did NOT give permission to do so), about to start up a process which is not only extremely dangerous (explosive potential next to explosive tanker cars and carrying volatile gas up the Puget Sound exposing thousands to death and destruction) but also extremely toxic, requiring fracked gas to be pumped in across our State (from BC, where there was a leak in their pipelines recently), increasing this infrastructure with its potential for failure.

As your website says, about half of the State lives in the Puget Sound region, giving you ultimate responsibility for the breathable air for millions of people (including all the non-human species).
"Every day we work to protect public health, improve neighborhood air quality, and reduce our region’s contribution to climate change."
We are thankful that you are here for us and our State and ask that you reject this permit and all further petitions from PSE, and any other entity involved, to continue with this plant.

Sincerely,
Anne Kroeker and Richard Leeds

Anne Kroeker
annek@36524.com
27915 10th Ave S
Des Moines, Washington 98198

2236-1 10. LCA Calculations
2236-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2236-3 10. LCA Calculations
2236-4 13. LCA Inputs and Assumptions - Natural Gas Source
2236-5 11. LCA Inputs and Assumptions - General

From: Anne Kroeker
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 4:51:14 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Anne Kroeker
annek@36524.com
27915 10th Ave S
Des Moines, Washington 98198

1758-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 8:49:29 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities. We have very little time left to deal with climate change-12 years according to a UN Report. We need to be working on turning Initiative 1631 into law.

Sincerely,

Jim Krueger
krueger@turbonet.com
99202

1842-1 22. General Opposition

From: Barbara Krupnik-Goldman
To: Public Comment
Subject: Tacoma LNG Terminal
Date: Monday, October 22, 2018 12:11:27 PM

To Whom It May Concern-
I am writing to urge you to reject the Puget Sound Energy Liquefied Natural Gas project.
The recent report issued by the IPCC makes it even more clear that curtailing CO2 emissions is urgent. The current SEIS is flawed, and consideration of the true environmental impacts is essential.
Thank-you,
Barbara Krupnik-Goldman

1574-1 5. Regulatory Framework
1574-2 3. Outside of SEIS Scope

From: James Kuhlman
To: Public Comment
Cc: James Kuhlman
Subject: LNG - Opposition
Date: Monday, November 5, 2018 10:30:53 AM

To Whom It May Concern -

I am writing to express my opposition to the construction of the LNG facility on the Tacoma Tideflats. I believe the city/Port is being short-sighted not only in allowing PSE to begin construction before all the approvals were obtained or the Tribe on whose lands this is being built was consulted, but in apparently assuming that since construction began, we should continue with it. Given the IPCC findings, we need to think long-term about something that will cause cumulative harm to our environment - and particularly to our air quality. We need to look at the delivery of natural gas as a system and make our environmental impact decisions based on what this proposal does from point of origin to ultimate destination (the ships). As to jobs, has anyone considered the number of jobs we could create to find alternatives? Think of the statement this city could make to the nation and in concert with all the Ports up and down the Pacific when we say 'no' to this and that we will only support environmentally sound activities. Given our strategic location, I am sure this will provoke shipping companies to really begin working on/investing in sustainable solutions.

Further, I am concerned that if this is approved, the next step will be that PSE will request this become part of a bigger distribution facility and the additional environmental issues that would arise.

The citizens spoke to you about the Methanol plant and they are speaking to you again about the LNG plant. Please listen and respond accordingly, as it is YOUR decision that will make the difference. Our existence matters more than economics right now.

Teri Wiseman-Kuhlman

1578-2 3. Outside of SEIS Scope
1578-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1578-3 3. Outside of SEIS Scope

From: James Kuhlman
To: Public Comment
Subject: LNG Facility Construction Tacoma
Date: Monday, November 19, 2018 12:28:53 PM

To Whom It May Concern,

I am very much opposed to the construction/completion of the LNG facility located in the Tideflats of Tacoma. Given the surrounding environment and geography, an accident could be catastrophic. This is not a permanent nor temporary solution to any atmospheric problems that exist as leakage of natural gas (methane) will have a much larger detrimental effect on the environment. The natural gas will be obtained by fracking and fracking is one of the most ecologically damaging systems used.

We need to look for long term solutions now. There's no time to waste with implementing solutions that fix one problem but create multiple larger problems. Approval for this project must be denied.

Sincerely,
James Kuhlman

1661-1 3. Outside of SEIS Scope

From: Robert Kuljis
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 13, 2018 12:16:45 AM

Puget Sound Clean Air Agency,

Dear PPSCAA

First of all, fracked gas is an environmental nightmare poisoning water resources, and destroying lives and livelihoods of people affected by the externalized cost of this pollution. The activity is also being linked to triggering earthquakes. Fracking is has also been exempt from the Clean Water Act, and there is little or no oversight to the pollution it causes. The process should be entirely illegal.

Second, the consensus on the need to eliminate fossil fuel use can not be denied. Any attempt to contribute to the sale and distribution of fossil fuel is a grave threat to humanity. The only appropriate use of this fuel is to facilitate a transition off of these fuels. Facilitating the transport of fuel merely for corporate profit is a massive crime and unacceptable.

Thirdly the transportation and storage of these fuels also pose a specific threat to the communities that the are routed through, stored , and processed.

For these reasons plans for the LNG plant need to be rejected

Robert Kuljis
rjkuljis@gmail.com
11224 kapowsin HWY E
Graham, Washington 98338

2224-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2224-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2224-3 3. Outside of SEIS Scope

From: Yvonne Kuperberg
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, November 12, 2018 10:38:13 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.

Scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?

-1) What is the maximum earthquake magnitude (also modeled depth & epicenter distance) along the Tacoma Fault & Cascadia megathrust the LNG facility could withstand in the OBE and SSE scenarios? Alternatively what is the %g horizontal ground acceleration the LNG facility could withstand during a seismic event?
2) What is the maximum tsunami run-up height the LNG facility is capable of withstanding?

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Yvonne Kuperberg
ykupe@raincity.com
14714 Bethel Ln SW
Vashon, Washington 98070

0472-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

At the very least; due diligence requires that a new, accurate, and complete SEIS be conducted, and the public be given a new 30-45 day period to review it and make public comment.

Thank you,
William Kypinse

Please include this in the final supplemental environmental impact statement.

Name: WILLIAM KYPINSE	Phone: 253-559-2079
Mailing Address: 2522 N Proctor St #57 TACOMA WA 98406	Email: williamkypinse@gmail.com

0475-3 22. General Opposition
0475-3 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0475-3 10. LCA Calculations

Dear Puget Sound Clean Air Agency,

refinery, which would contribute to climate change and poison the water supplies of First Nations communities in Canada, is being forced upon a community which managed these lands sustainably for Millenia.

The SEIS is flawed; it does not consider the diesel outputs of sand + water trucked to fracking sites. It also contains many tables with fields lacking information and obvious errors.

Please include this in the final supplemental environmental impact statement.

I ask that you reject PSE's permit to construct/operate its LNG facility.

Name: William Kupinse	Phone: 253-359-2079
Address: 2522 N Proctor St #57 TACOMA, WA 98406	Email: william.kupinse@gmail.com

Thank you
William Kupinse

0477-3 22. General Opposition
0477-3 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0477-3 10. LCA Calculations

Dear Puget Sound Clean Air Agency,

I am a Tacoma resident and the parent of an eleven-year-old daughter. I have read the UN climate commission's recent report, which predicts with a high degree of certainty devastating climate impacts by 2040 if the world does not immediately shift to non-greenhouse gas emitting energy sources. Allowing PSE to lock in 50 years of burning fracked gas - much of which leaks during drilling and transport and is itself a potent GHG - threatens the future of my daughter and children everywhere. I have read the SEIS, and even to this non-scientist, it is obviously flawed, with numerous field indicating missing data, ~~error~~ making errors by transposing feet^3 + meters^3 and using outdated + disproven climate data. The SEIS is too severely flawed to allow the LNG refinery to be permitted. I ask you to disallow the permit of construction.

Please include this in the final supplemental environmental impact statement.

Name:	Phone:
Address:	Email:

Robert

Steve: Thank you. Next up, Tiffany MacBain.

[06:29:00] William Kupinse.

William: I had something very neat typed up, when I came here, and I've rewritten it many times, most recently, in my head, in response to some of the comments that I heard. So, we'll see how this goes. My name is William Kupinse, and I'm a Tacoma resident apparent and professor of English at the University of Puget Sound where I teach courses on environmental writing and the literature of environmental justice. I'm here because I stand with the Puyallup Nation in opposing the LNG refinery, and I incorporate their comments by reference into my own here.

[06:30:05] I'm here because I stand with those communities in Canada and the US where their water would be threatened by the fracked gas PSE wants to pipe to Tacoma. And I stand with the men and women, at the Northwest Detention Center, who would be breathing in the pollution from this fossil fuel refinery, with no way to escape. I've heard a number of the people who are speaking in favor of the LNG plant, the fracked gas refinery. And a kind of common thread I've noticed is I stand for science. And I stand for science, too. And I think it's important for us to understand what exactly is in that report.

There's science, and I work with scientists. I, in my own research, come across science.

[06:31:00] And it works this way. It works through a process of peer review where, anonymously, things are sent out. Studies are written up as papers. They're sent out to outside reviewers who then weigh in. And that determines whether something gets published. And other people have a chance to weigh in on that. Now, the fact that the science that was used in that report was questioned by the actual scientists who are here let's me know that there may be a problem with that. There's also a disclosure of financial interest. And there's also a sense that there's a progressive increase in knowledge.

A study from 2016 is going to, on the whole, if it's going through that peer review process, be more reliable, be more closer to producing truthful information, than one that is from 2007. So, you've got science, and then, you've got the interpretation of science. And there, it becomes much, much messier. And you have to think about what scientific studies are most relevant.

[06:32:00] And that is not always a completely obvious thing. Are we picking the scientific studies that, in fact, speak to the issues that we're looking for? And even more generally, how is the data being used, whether it's in a scientific study or whether it's in the SEIS itself, the draft SEIS? Where is that data coming from? Because I know that self-reported data is notoriously unreliable. If you ask people to self-report how often they floss their teeth, you're going to get a much higher level than you will if you were actually to sit there and watch whether people floss at night.

Self-reported data is even less reliable, when the entity reporting the data has a financial interest in that data. So, if you're the people who are up there running a fracking well, and you're like, yeah, look how low our numbers are, it's like, gee, I'd be surprised if they weren't.

[06:33:00] So, science, the interpretation science. I support science, and I support the responsible interpretation of science. And I do not see the responsible interpretation of science in that SEIS. I ask you to reject it. Thank you very much.

From: Main Fax
To: Carole Cenci
Subject: FW: New 1 page fax from 4046019001 - SEIS Comment
Date: Tuesday, November 20, 2018 8:40:44 AM
Attachments: fax-2088358.pdf

From: no-reply@sendfax.io [mailto:no-reply@sendfax.io]
Sent: Monday, November 19, 2018 5:56 PM
To: Main Fax
Subject: New 1 page fax from 4046019001

You've received a fax!

- From: 12532764646 (4046019001)
- To: 2063437522
- Pages: 1
- Fax Date: 11/19/2018 5:55 PM PST

1292-1 22. General Opposition

FAX COVER SHEET

TO	pubic comments on DSEIS, PSE LNG project
COMPANY	
FAX NUMBER	12063437522
FROM	Janet Kurz
DATE	2018-11-20 01:54:23 GMT
RE	UNKNOWN

COVER MESSAGE

P)lease do not continue building the fracked gas refining storage and fueling facility in the Port of Tacoma or anywhere in WA state. We do not need to support a practice that is so very bad for our environment and is poisoning precious water supplies. I am absolutely and totally against this harmful project.
Janet Kurz
Tacoma, WA 98465

1492-1 22. General Opposition

From: Janet Kurz
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:06 PM

Name: Janet Kurz
Email: Kurzwy@me.com
Address: 1019 S Pearl St Apt L -
Tacoma, Washington 98465

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please do not let this happen in Tacoma!
I am totally against letting this facility being built and operated here. Totally bad for our environment and for the places where fracking is happening.

1541-1 22. General Opposition

From: David Lambert
To: Public Comment
Subject: Comment on LNG
Date: Friday, November 16, 2018 9:22:45 AM

Dear Puget Sound Clean Air Staff:

As members with the Tacoma Fellowship of Reconciliation , a local justice and peace organization, affiliated with the regional, national, and international Fellowship of Reconciliation, we strongly urge you recommend discontinuance of any further construction of the LNG plan on the Tacoma tide-flats. Alternatively, we vigorously encourage support and action for 100% investment in solar, wind, and geothermal sources of renewable energy in this area.

Sincerely,

David Lambert, Chairperson.

--
Joanna Macy: “Gratitude is
the antidote to greed.” "The necessary new version of the American dream is not to get rich, but to realize that we are already rich (Rick Hanson)."

1579-1 22. General Opposition

From: David Lambert
To: Public Comment
Subject: LNG facility
Date: Sunday, October 21, 2018 4:52:43 PM

Dear Puget Sound Clean Air Agency:

I am strongly opposed to any further development of the liquefied natural gas facility in Tacoma. Most of natural gas is fracked, resulting in release of methane a very powerful greenhouse gas. The time is overdue to invest strongly in renewable energies such as solar, wind, geothermal, etc. in Tacoma and Pierce County, not in natural gas. The recent ICC Report clearly outlines that climate change is occurring much faster than any of us imagined and our planet needs a rapid transition to renewable energy, and away from fossil fuels, now. This is an existential threat, a moral issue, and one we particularly needed to meet for the sake of our young people now alive, future generations, and the natural world.

Thank you for the opportunity for me to share my views.

Sincerely,

David Lambert
Pierce County resident

--
Joanna Macy: “Gratitude is
the antidote to greed.” "The necessary new version of the American dream is not to get rich, but to realize that we are already rich (Rick Hanson)."

0303-1 3. Outside of SEIS Scope
0303-2 22. General Opposition

To whom it may Concern,

Building Anything 5 feet above sea-level seems idiotic; on mud and wetlands, where an earthquake and/or Tsunami would gravely impact a huge LNG facility.

Are people permitting this project truly looking at the potential catastrophic effects should a natural desaster occur?

The community rejects this plan, STOP the LNG construction! Martha Lambert

Martha A. Lambert
413 Farallone Ave
Fircrest, WA 98466-4107

RECEIVED
OCT 18 2018
Puget Sound
Clean Air Agency

PSCAA
Attn: Public Comment on
DSEIS, PSE LNG Project
1904 Third Ave Suite 105
Seattle WA 98101

USA FOREVER

2182-1 3. Outside of SEIS Scope

From: Franny1005@everyactioncustom.com on behalf of Francine Lane
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Thursday, October 25, 2018 4:25:28 PM

Dear Responsible Official,

Fracking gas has proven itself to be more harmful than helpful and that was well before we knew how severe all the effects of fracking would be.
.
To bring an eight million gallon liquified natural gas project to a beautiful treasured area is incomprehensible.

The time for fossil fuels is over. Forward looking countries are moving to replaceable clean energy. The only reason we are not is almighty buck.

Climate change is real. We can see for ourselves what's happening. Does it matter what percentage is nature and what is caused by man? We must move with urgency and resolve away from resources so harmful to our environment such as methane.

Please look to the future. Our health of our planet and the life on it depends on the decisions made today. We can only implore you to do the right thing. And the right thing is a full, complete, honest and fair environmental study be conducted before one step further is taken on this project.

Sincerely,
Francine Lane
Amagansett, NY 11930
Franny1005@gmail.com

1982-1 23. General Support

From: Steve Langager
To: Public Comment
Subject: PSE LNG permit comment
Date: Friday, November 2, 2018 11:59:59 AM

I support the findings in the DSEIS. I and my family live overlooking the tide flats and observe the plume of exhaust from many of the ships coming and going out of the Port of Tacoma. Any step we can take to transition from bunker fuel to a cleaner alternative is a positive step. After living in oil/gas producing areas for many years and seeing the flaring off of gas, I feel that this resource needs to be recovered. We are producing the nat gas anyways, many times as a byproduct of oil production, better to us it in a productive manner than to flare it off.
Having had to address an abandoned tank of bunker fuel in a previous career, almost anything is cleaner and more effective than this form of hydrocarbon.
I do take exception to the fact that the DSEIS only sees the benefit of western Canada (British Columbia) gas. After vacationing in North Dakota, if only a small portion of the currently flared off gas as captured and put to work, the overall greenhouse gas levels would be a net reduction.

Steve Langager

1511-1 22. General Opposition

From: Dorothy Larco
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:49 PM

Name: Dorothy Larco
Email: dlarco1@comcast.net
Address: 9401 SW Taylor St -
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

You've read the latest reports on what has happened and continues to happen to earth's environment, right? If you have ANY wish to preserve air and water and trees for our children and grandchildren, you will not authorize more fracking. Please think this through! Sacrifice the well-being of future generations for the sake of immediate profit? You REALLY want to do that?

1526-1 5. Regulatory Framework

From: Carolyn Latierra
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:11:51 PM

Name: Carolyn Latierra
Email: a.biophiliac@gmail.com
Address: 3223 NE Knott Street -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

There are many sound scientific reasons to oppose permitting this Tacoma LNG system. On those alone it is a hazardous plan. The immorality of violating Puyallup Treaty rights is the essential center of the objection that I wish to state. How is it possible that the dominant culture of this nation still puts exploitation before all else? Is there still no respect for sovereignty of a nation within the larger nation? As my long gone grandma would admonish me when my moral compass was in doubt " you should be ashamed."

[04:51:08] So, next up is Kathy Lawhon.

Kathy: My name is Kathy Lawhon. I live on the Hilltop. So, I'm in the blast zone. The gentleman, some of what he said might be true, if you ignore fracking. But let's not ignore fracking because that would be incredibly selfish, would it not? Fracking is the literal rape of Mother Earth. It is a violent, disgusting, destructive, horrible thing that is done to this earth increasingly everywhere where they have these fields of shale.

[04:52:00] It's just unbelievable. They drill down to the shale, and then, they drill this way, and they drill that way, and they drill this way. And they put so much sand and water. It's so much fresh water that we can't afford. And then, they reuse some of it, if they can get enough contaminants out of it. And then, it gets so contaminated that their ponds run over. So, they inject it into the earth. And if it gets close to a fault, that's where the earthquakes come in. But it's low birth weights, it's cancer. It's the literal rape of the earth. And I don't know anything that's more Trumpian, frankly, than allowing a corporation that claims that they're local, and they are not.

They claim they are safe, and it is not, and we know it. It can't be safe sitting on fault lines in the line of lahars, in the line of tsunamis. We had a 2.9, as somebody pointed out, in Fircrest yesterday or the day before.

[04:53:03] It is insane. It is so destructive. It is so selfish, if we sit here, and we believe the lies of Puget Sound Energy. There is nothing more Trumpian than what they're doing to this town. They stole our politics. They've lied to us constantly. They spend millions on a lying PR campaign. And it's all to kill the earth. And it's all to have their way with Tacoma. And we're not having it. We are not having it. Thank you.

1168

1168-1 3. Outside of SEIS Scope

1517-1 22. General Opposition
1517-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1517-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1517-4 13. LCA Inputs and Assumptions - Natural Gas Source

From: Lenora Lawrence
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:40 PM

Name: Lenora Lawrence
Email: lookinwest@gmail.com
Address: 460 Capes Drive West -
Oceanside, Oregon 97134

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

• The SEIS draft analysis is incredibly flawed and unacceptable. It does not account for the full climate impacts of fracked gas.

• Methane is significantly more potent in the near-term, yet the SEIS analysis only looks at the long term impact. Methane is a significantly more potent greenhouse gas than carbon dioxide, especially in the short term.

• The 2018 report found that 85 percent of active wells are directly venting methane daily, and that those leakages have been historically underreported.

• The same report found that methane emissions in BC are 2.5 times higher than reported.

• No guarantee that all of the fracked gas would come from BC - The draft claims that all of the natural gas will be coming to the facility from British Columbia.

1653-0 23. General Support

From: Leiv Lea
To: Public Comment
Subject: Puget Sound Energy air permit
Date: Wednesday, November 21, 2018 2:32:41 PM

To Whom It May Concern,

I am writing in support of Puget Sound Energy and their LNG facility in Tacoma. This is a step in the right direction for the environment as well as the maritime industry.

I work for Foss Maritime and we provide tugs and barges for transportation and ship assist services in the Puget Sound area as well as along the USWC and globally. We see the trend toward LNG and applaud it. The environmental benefits in reduction of SOx, particulate matter, nitrogen oxides and greenhouse gasses are irrefutable.

The Puget Sound is an amazing natural resource and we must do our best to maintain the environment while also supporting the local industries and communities that depend on them.

Please issue the permit without delay.

Best Regards,
Leiv Lea

1747-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 11:24:52 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Kathleen Lee
kathyjlee60@hotmail.com
98503

1472-2 22. General Opposition
1472-2 5. Regulatory Framework

From: marguery lee zucker zucker
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 9:22:42 PM

Name: marguery lee zucker zucker
Email: lee@thelocomotive.com
Address: 1966 Orchard St -
Eugene, Oregon 97403

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

As you know, Puget Sound Energy is trying to build a liquefied "natural" gas processing/ storage/fueling facility in the Tideflats area of Tacoma.

My family and I are strongly opposed to this project: It is sited on Puyallup Tribal lands and is being built without their consent; and--more alarming--its inevitable negative impact on the environment is especially concerning at this time of ever-increasing, alarming climate changes.

1977-1 23. General Support

From: Lisa Lefeber
To: Public Comment
Subject: Port of Everett Support
Date: Tuesday, October 30, 2018 1:32:17 AM

Similar to the Ports of Seattle and Tacoma, Everett wishes to express its support for Puget Sound Energy's liquefied natural gas facility.

The Puget Sound Clean Air Agency SEIS dated October 8 concluded the environmental advantage of replacing transportation diesel fuel with clean burning LNG. We support the agency's issuance of the necessary permit(s) for the project to proceed.

Lisa Lefeber
Acting CEO/Executive Director
Lisam@portofeverett.com

1796-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:09:10 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracking in an already earthquake-prone area is a recipe for disaster. If you look at the recent earthquake activity in Oklahoma, putting the Puget Sound at risk for the same is a rash decision that should result in significant liability for PSE should the same occur.

Sincerely,

Mindy Leffler
mindy_lef@hotmail.com

Carole: Thank you. So, the next group is Victoria Leistman, Rachel Hogan, Lester Pogue, Kelly O'Hanley, and Charles Barnhart. So, Victoria Leistman is first.

[02:34:00]

Victoria: Hi, Air Agency staff. Good to see you. My name is Victoria Leistman, and I'm an organizer with Sierra Club. I wanted to share a brief personal note today. Two weekends ago, I was at a cabin with a group of friends, and we decided to watch a movie. After finding nothing appealing in the comedies on Netflix, we moved to dramas and picked something we all thought sounded interesting. It wasn't until we hit play that I registered what we chose. Wind River. I'd heard of the film mostly from activists in the Missing and Murdered Indigenous Women's Movement. The movie takes place on the Wind River Indian Reservation.

It follows the story of an 18-year-old indigenous woman who is raped multiple times before running barefoot 6 miles in the snow to her death. The men who raped her were living in a man camp working at a nearby drilling rig.

[02:35:00] There aren't words for how this has stuck with me. I've cried. I've felt sick, mostly because it visualized for me a story that I know is tired and true and, unfortunately, not isolated. Mostly because I know my grief and disgust pales in comparison for people who have lived this experience. When you consider the upstream impacts of fracked gas, I know that you're examining methane impacts and the science as you 100% should. But I also want you to think about how implicated the fossil fuel industry is in the rape and pillage not only of the earth but of human beings.

From the point of extraction to the end use, fracked gas violates human rights. It is a heartbreaking, enraging environmental injustice.

[02:36:00] I wanted to turn in the first batch of thousands of comments that Sierra Club has been collecting and will continue to receive throughout the comment period. We stand with the Puyallup Tribe in opposition to this facility. There are hundreds of people here today, people who have no financial interest and no motivation other than to give you basic facts and to share with you what's written on their hearts. Please do not accept this poorly composed draft and think of Wind River and all of the individuals and communities impacted throughout the lifecycle of gas, as you make your decision. Thank you.

1650-1 10. LCA Calculations

From: Hannah Lemke
To: Public Comment
Subject: Puget Sound Clean Air Agency
Date: Thursday, November 15, 2018 2:37:54 PM

To whom it may concern,

The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have “placeholder” values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.

Thank you,
Hannah Lemke

2195-1 22. General Opposition

From: dodielenas@everyactioncustom.com on behalf of Deloris Lenas
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Monday, October 22, 2018 1:23:46 PM

Dear Responsible Official,

This project is not sustainable or safe without further study and a plan to keep all of us safe.

Sincerely,
Deloris Lenas
Saint Petersburg, FL 33710
dodielenas@yahoo.com

[06:36:00]

Steve: Thank you. Kathryn?

Kathryn: I'm sorry. I missed the heads up.

Steve: You're Kathryn?

Catherine: Yes. My name is Kathryn Lewandowsky. And I'm from Arlington, Washington. I am the fourth generation granddaughter from an Italian, English, Irish, and Scotsman trespassers who immigrated here. They came in a mob. And they invaded this country. And 59 years ago, I was born here in Tacoma. And I grew up here. And I raised my children here. And, honestly, I always felt really bad about that because we were known as the aroma of Tacoma, which other people have mentioned. And other people told me it was just a dirty, little town.

[06:37:00] And that's kind of how I always felt that that's the town I came from. In recent years though, Tacoma made such huge advances in cleaning up. And I was so proud of what they had done. It's been amazing, the differences, especially after getting rid of Asarco. So, and I also, I'm sorry, I did want to say that I truly apologize to the people of the Puyallup Tribe. And I recognize that their authority in that they have been the caretakers of this land, and they deserve to have a say in this.

So, I did want to say that. I just want you guys to remember that the decisions you make in a board room, when you're looking at numbers, those are going to be affecting our children, my family who still lives here, our children, our grandchildren. And I urge you please not to look at the numbers.

[06:38:00] And when people say that there's only this option and that option and no other option, I really think that that's very short sighted of you. And you really need to have more faith in the ingenuity that our children are intelligent enough that we're going to figure out how to fix this. But it's obvious, to me and to most everybody, that fracking is not good. It's not good to our earth. And so, I encourage you not to approve this. Thank you.

2232-1 22. General Opposition

From: Hannah Lewis
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 6:59:16 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

The IPCC report states that "rapid and far-reaching" transitions are required for energy, industry, cities, transport and land use if we are to avoid the catastrophic outcomes of exceeding 1.5C degrees of global warming. This limit does not leave space for new fossil fuel infrastructure. On the contrary, we should begin decommissioning natural gas and other fossil fuel facilities.

We must prioritize ecosystem restoration to stabilize Earth's carbon and water cycles, and invest fully in renewable energy. And we need to make these changes now, not tomorrow.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Hannah Lewis
hannahkathrynlewis@gmail.com
215 10th Ave. S.
Minneapolis, Minnesota 55415

1469-1 22. General Opposition

From: Patrick Lewis
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 9:53:32 PM

Name: Patrick Lewis
Email: Patlewispdx@hotmail.com
Address: 17 Ne 5th st - Po box 2946
Battle ground, Washington 98604

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Stop. Do not built gas facility in tacoma

1139-1 23. General Support

[00:50:00]

Carole: Thank you. Frank Leyritz?

Frank: Thank you very much for the opportunity to speak. As a lifelong resident of the Puget Sound area, I'm supporting PSE's LNG facility, at the Port of Tacoma. In my opinion, this facility will benefit all of us. 1) It will provide PSE's residential and commercial customers with natural gas reserves to ensure an adequate natural gas supply, in the event of a major emergency.

This is significant due to the recent natural gas pipeline explosion in British Columbia and the resulting pipeline shut down, which impacted the northwest region in mid-October. Utilizing local media, PSE asked customers to temporarily reduce hot water usage and lower furnace temperatures to conserve natural gas.

[00:51:05] If this rupture would have occurred in very cold weather like January or February, it would have been a major impact to our personal comfort and may have required businesses with high natural gas usage to reduce their usage or possibly suspend operations. 2) The Tacoma facility provides local transportation companies like TOTE Maritimes, Alaska cargo vessels, with a significant cleaner fuel alternative. We will have the cleanest shipping fleet on the west coast. LNG reduces the risk of cargo ships, diesel, or bunker fuel spillage in both Commencement Bay and in Puget Sound, particularly during refueling operations.

We wish for clean air and water here in the Pacific Northwest.

[00:52:02] Mr. Kendall mentioned four environmental factors that I also support. The use of LNG is forecasted to increase. The Tacoma facility will meet the needs of new LNG customers for powering buses, trucks, and hopefully, cruise ships, in the future. I see this as a chicken and egg, which comes first, issue. If there's an LNG facility, it will increase the refueling opportunities for new LNG customers. LNG is not a new technology. The LNG industry has had an exceptional safety record for over the past 50 years. PSE safely operated the LNG facility over in Gig Harbor for nearly 14.

[00:53:00] The design for the Tacoma facility has been well vetted by environmental permitting and specialists. Thank you very much.

From: Ryan Likkel <Ryan@wrsweb.com>
Sent: Wednesday, November 21, 2018 5:27 PM
To: Public Comment
Subject: Support Letters for LNG Terminal
Attachments: 0923_001.pdf; 0924_001.pdf; 0925_001.pdf

Thank You.

Ryan Likkel
Chief Operations Officer

2380 Grandview Rd.
Ferndale, WA 98248
Office (360) 366-3303
Fax (360) 366-3304
Cell (360) 815-5182
www.wrsweb.com

Puget Sound Clean Air Agency,

As a long-time resident of Washington State, I carefully watch what is going on in our area to determine what is best for my family, neighbors, and community. I feel very strongly about keeping our waterways and shorelines clean and safe, our air healthy, and our public services properly funded. It is from this perspective that I express my support for the Puget Sound Clean Air Agency (PSCAA) to finalize the draft SEIS it presented on October 8, 2018 and to issue the permit(s) that Puget Sound Energy (PSE) has requested for its liquefied natural gas (LNG) facility at the Port of Tacoma.

We all pay our fair share of taxes, and an important benefit of the LNG project is that it will generate millions of dollars in tax revenue for local schools and other state and local government services. I appreciate and value seeing projects that will lead to increased tax revenues to help our local schools and public safety departments.

The LNG facility will improve our marine environment by providing a cleaner fuel alternative for vessels owned by TOTE Maritime and berthed at the Port of Tacoma. LNG reduces the risk of fuel spills over water thereby preventing damage our waterways. It will also help reduce greenhouse gas emissions and virtually eliminate visible particulate emissions produced by ships. This is a very favorable outcome for the citizens of Tacoma and the entire South Sound region, namely better air quality with accompanying reduction in health risks.

Another thing is also clear: this will be good for our local economy. I strongly support the region's efforts to create a healthy business climate for local companies who choose to do business in Tacoma. Tacoma is a working industrial marine port-based community, and both TOTE and PSE are respected, long-time area businesses here. We all benefit from both the family wage jobs they provide within the Port, and the fact that both are committed to using the best available environmental technology to remain competitive in the world economy is a boon to our entire community.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

I am confident in the conclusion of the draft SEIS that the project will result in a decrease in GHGs. I look forward to publication of a Final SEIS that confirms the draft's conclusions about LNG fuel benefits. I urge you to move forward and approve the PSCAA permit(s) for Tacoma LNG. This project will provide great benefits to the citizens of Tacoma, Pierce County, and Washington State for years to come.

Bill VanZanten



Corporate Office: 2380 Grandview Road, Ferndale WA 98248 Phone: (360) 366-3303 Fax: (360) 366-3304

Puget Sound Clean Air Agency,

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. This specifically includes my concurrence with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing diesel or bunker fuel currently used by the maritime industry with LNG fuel. Switching from diesel to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%. It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in.

It is also important to note that LNG powered ships will substantially exceed the North American Emission Control Area requirements established by the International Marine Organization's (IMO). The IMO regulations have required a reduction in the fuel sulfur content from 3.5 percent to 0.5 percent. Both US EPA and the Coast Guard are enforcing these fuel regulations which have been estimated by EPA to reduce mortality by as much as 30,000 people per year. TOTE has made the commitment to use LNG fuel, which provides substantially greater benefits than even the IMO regulations mandate.

Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

Thanks for the opportunity to express opinions in this matter.

Sincerely,

Bill VanZanten
CEO/Owner

Ryan Likkel
COO/Owner

Puget Sound Clean Air Agency,

As a long-time resident of Washington State, I carefully watch what is going on in our area to determine what is best for my family, neighbors, and community. I feel very strongly about keeping our waterways and shorelines clean and safe, our air healthy, and our public services properly funded. It is from this perspective that I express my support for the Puget Sound Clean Air Agency (PSCAA) to finalize the draft SEIS it presented on October 8, 2018 and to issue the permit(s) that Puget Sound Energy (PSE) has requested for its liquefied natural gas (LNG) facility at the Port of Tacoma.

We all pay our fair share of taxes, and an important benefit of the LNG project is that it will generate millions of dollars in tax revenue for local schools and other state and local government services. I appreciate and value seeing projects that will lead to increased tax revenues to help our local schools and public safety departments.

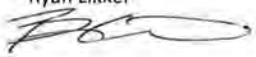
The LNG facility will improve our marine environment by providing a cleaner fuel alternative for vessels owned by TOTE Maritime and berthed at the Port of Tacoma. LNG reduces the risk of fuel spills over water thereby preventing damage our waterways. It will also help reduce greenhouse gas emissions and virtually eliminate visible particulate emissions produced by ships. This is a very favorable outcome for the citizens of Tacoma and the entire South Sound region, namely better air quality with accompanying reduction in health risks.

Another thing is also clear: this will be good for our local economy. I strongly support the region's efforts to create a healthy business climate for local companies who choose to do business in Tacoma. Tacoma is a working industrial marine port-based community, and both TOTE and PSE are respected, long-time area businesses here. We all benefit from both the family wage jobs they provide within the Port, and the fact that both are committed to using the best available environmental technology to remain competitive in the world economy is a boon to our entire community.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

I am confident in the conclusion of the draft SEIS that the project will result in a decrease in GHGs. I look forward to publication of a Final SEIS that confirms the draft's conclusions about LNG fuel benefits. I urge you to move forward and approve the PSCAA permit(s) for Tacoma LNG. This project will provide great benefits to the citizens of Tacoma, Pierce County, and Washington State for years to come.

Ryan Likkel



0815-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency



3007 Federal Ave
Everett, WA 98201

23 OCT '18
PM 6 L

10-22-18

Dear Puget Sound Clean Air Agency:
I would like an honest environmental impact study. I belive the SEIS is deficient and needs further study. Out dated science was used in the analysis - a 20 year analysis would be more appropriate.

Sincerely Jennie Lindberg
Jennie Lindberg 3007 Federal Ave
Everett, WA 98201

2211-1 22. General Opposition

From: mrdanalinder@everyactioncustom.com on behalf of Dana Linder
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:59:22 AM

Dear Responsible Official,

All scientific evidence says "no new oil". Every drop of fossil fuel kills the planet a little more. We need to stop NOW.
We don't need new oil, we need a new technology. Any minute or dollar spent on oil takes away time and money from the new technology and destroys the environment that much more.
If the oil companies were told that we would not use any more oil in a year, in a year THEY would have the new technology.

Sincerely,
Dana Linder
Woonsocket, RI 02895
mrdanalinder@gmail.com

1537-1 22. General Opposition
1537-2 13. LCA Inputs and Assumptions - Natural Gas Source

From: janelindley@earthlink.net
To: Public Comment
Subject: Comment for PSE's LNG Hearing at Puget Sound Clean Air Agency
Date: Thursday, November 1, 2018 2:17:20 PM

I'm glad that the Agency works everyday to PROTECT public health, IMPROVE neighborhood air quality, and ***REDUCE our region's contribution to climate change***.

In part, because the Department of Ecology for Washington State has some *pretty* impressive GHG emission reduction goals, including to:

- Reduce overall GHG emissions to 1990 levels by 2020 – **that's *ONLY 2 years away***.
- Then to reduce overall GHG emissions to *25 percent below* 1990 levels by 2035.
- And, finally to reduce emissions to *50 percent below* 1990 levels by 2050.

How are we going to meet these goals if we continue to build fossil fuel infrastructure INSTEAD of transitioning to renewable energy? ***We're not.***

The Draft (SEIS) states that it focuses *exclusively* on the lifecycle of GHG emissions. And, that the approval of PSE's LNG Facility is DEPENDANT on British Columbia being the SOLE source of its natural gas supply. How can British Columbia be considered better than anything else when a pipeline exploded near Prince George, British Columbia earlier this month? It released UNTOLD amounts of methane and other Green House Gases into the air.

Please DENY the final Order of Approval for PSE's LNG Facility in Tacoma. To *truly* reduce GHG emissions we need *our* energy companies to transition *entirely* off of fossil fuels. There is no other way for Washington State to meet its GHG emission reduction targets.

Thank you.

Jane Lindley
Climate Action Bainbridge member
jane@lowcarbongirl.com
P.O. Box 4574, Rollingbay, WA 98061

1148-1 22. General Opposition

Carole: Thank you. The next group is Jane Lindley, Michael Cox, Oneida Arnold, Darren Moore, and Tracy Wiegman. Jane Lindley?

Jane: Yes. Hi, I'm Jane Lindley. I live on Bainbridge Island. And I'm a member of Climate Action Bainbridge. I'm glad that the Clean Air Agency – okay, ready?

[01:38:00] I can speed along. Again, my name is Jane Lindley. I live on Bainbridge Island, and I'm a member of Climate Action Bainbridge. I'm glad that the Clean Air Agency works every day to protect public health, improve neighborhood air quality, and reduce our region's contribution to climate change, in part because the Department of Ecology for Washington State has some pretty impressive greenhouse gas emission reduction goals, including to reduce overall greenhouse gas emissions to 1990 levels by 2020. That's only two years away. And also, further, to reduce emissions to 25% below 1990 levels in 2035.

And finally, to reduce emissions to 50% below 1990 levels by 2050.

[01:39:00] How are we going to meet these goals, if we continue to build fossil fuel infrastructure, instead of transitioning to renewable energy? We're not. The draft SEIS states that it focuses exclusively on a lifecycle of greenhouse gas emissions and that the approval of PSE's LNG facility is dependent upon British Columbia being the sole source of its natural gas supply. British Columbia is anything but a silver bullet, especially since a pipeline exploded near Prince George, British Columbia earlier this month.

It released untold amounts of methane and other greenhouse gases into the air. Please deny the final order of approval for PSE's LNG facility in Tacoma. To truly reduce greenhouse gas emissions, we need our energy companies to transition entirely off of fossil fuels. There is no other way for Washington State to meet its greenhouse gas emission reduction targets. Thank you.

1369-1 22. General Opposition

From: Michael Lindsey
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:50:32 AM

Name: Michael Lindsey
Email: jussspiffy@hotmail.com
Address: 12405 SW Foothill Dr. - 12405 SW Foothill Dr.
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We all need to be able to change. Let's demand change.

1358-1 22. General Opposition

From: Ann Littlewood Littlewood
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 11:50:14 AM

Name: Ann Littlewood Littlewood
Email: annlittlewood3@gmail.com
Address: 2915 NE 21st Avenue -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please revisit the environmental impact statement. It is pretty obviously biased. Tacoma does not need a huge polluting gas plant. It makes no sense to invest in fossil fuel infrastructure when we all know we need to leave it in the ground or face a world we won't recognize. The climate situation is very bad and, fairy tales aside, we must respond.

2536-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2536-2 14. LCA Inputs and Assumptions - Leakage/Slippage
2536-3 7. SEPA Alternatives
2536-4 7. SEPA Alternatives

From: darvlloyd@everyactioncustom.com on behalf of Darvel Lloyd
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, November 6, 2018 6:51:08 PM

Dear Responsible Official,

I presume the fracked LNG is being piped from wells in British Columbia, which is extremely dangerous, considering that another subduction earthquake could rip through the area at any time, not to mention earthquakes from other faults. Plus there is the risk of a Mt. Rainier eruption and subsequent lahars flowing down rivers emptying into Tacoma Harbor.

But most importantly, we must phase out fossil fuel production and exports because of the greenhouse gases they produce, resulting in runaway global warming and eventual catastrophic loss of life worldwide.

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.

(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Darvel Lloyd
Portland, OR 97215
darvlloyd@gmail.com

0304-1 22. General Opposition
0304-2 3. Outside of SEIS Scope

Puget Sound Clean Air Agency

Attn: Public Comment on DSEIS, PSE LNG Project

1904 Third St. Suite 105

Seattle, WA 98101

RECEIVED
OCT 25 2018
Puget Sound
Clean Air Agency

Lynn Lloyd

1512 A St. NW

Lakebay, WA 98349

Oc t. 21, 2018

Dear committee member,

I live on the Key Peninsula, which is 17 miles from the Port of Tacoma as the crow flies. I have three basic concerns about the development of the LNG project there. First: the chemicals that will be released into the air as a result of the LNG process will be harmful to the people living in Tacoma. Second: The danger of explosions to the nearby people and businesses is horrific. Third: The fact that this will be a bunkering facility implies that fracked LNG will be sold for export. We must not develop new markets for fracked fossil fuels, but rather conserve and change to new technologies.

I see that our ship of state, with the corporate controlled federal government at the helm, is not leading the way to a sustainable future. With the unsustainable options looming before us, we must paddle our way as best we can to turn our behemoth country away from fossil fuels and toward a future for our children and grandchildren.

Thank you for your attention to this.

Lynn Lloyd



0304

Lloyd
1512 A St. NW
Lakebay, WA 98349

TACOMA WA 983
OLYMPIA WA
22 OCT 2019 PM 4 L



RECEIVED
OCT 25 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS, PSE LNG Project
1904 Third St. Suite 105
Seattle, WA
98101

98101-331730

1376-1 22. General Opposition

From: Sarah Lombardi
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 9:39:48 PM

Name: Sarah Lombardi
Email: lom.917@gmail.com
Address: 3818 SE 16th Ave -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

If we're creating new infrastructure for energy creation, it needs to be coming from renewables and it needs to be coming yesterday. Twelve years is not a lot of time to get our proverbial ducks in a row when it comes to climate change. I urge you to do the right thing for the environment and public health. Say no to the LNG Refinery.

1798-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:10:13 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

As an environmental educator, it is crystal clear that we need to burn less fossil fuels, not more, regardless of the type. Fracked gas destroys and pollutes our water table, releases enormous amounts of methane, and is a major factor in climate change. We must stop stealing the future from our children.

Sincerely,

Dan Lombardo
danlombardo42@gmail.com
98404

1381-1 22. General Opposition

From: Joe Lopez
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 5:56:54 PM

Name: Joe Lopez
Email: jfdddflopez@gmail.com
Address: 4356 NW Palmbrook dr -
Beaverton, Oregon 97006

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please disapprove this gas project. We cannot afford the impact on our atmosphere. Pumping more co2 in the air must stop now. People are burning alive from forest fires caused by global warming. Doughts are everywhere. Our NW climate is suffering with record low rainfall and record high temperature s.

1830-1 22. General Opposition

From: Joseph Lopez
To: Public Comment
Subject: Tacoma LNG Plant
Date: Wednesday, November 21, 2018 1:47:27 PM

I am opposed to building the proposed LNG Facility in Tacoma, or anywhere in the Puget Sound. The great challenge of our lives is addressing climate change. Any increase in emissions in our area is a step backwards in that fight.

There is no need for LNG. PSE claims that the fuel will be used to meet high demand for natural gas, but it would be preferable for customers to reduce their usage or identify alternative, cleaner fuel options (e.g., solar). Every home using natural gas for heat also has electricity, and electric heating may be used as a supplement should any shortage of gas occur.

TOTE Marine is also identified as a potential user of LNG, but there are better options for marine fuels as well. The Washington State Ferries are moving to electric power as a cleaner alternative to current fuels. That means that electric power for large ships will be available in our area, and there will be local expertise for installing and maintaining equipment. In addition, TOTE recently pushed back (by some years) the date by which it expects to convert over to LNG-powered ships, and this rollback raises the question of whether they aren't exploring options other than LNG.

In addition, given the location of the Northwest Detention Center (close by on the Tideflats and housing more than 1500 detainees), the emissions associated with this facility become of particular concern.

Given recent reports about the imminent impacts of warming and climate change, it would be irresponsible to approve any increase in emissions in the Puget Sound region unless there is a compelling need. There is no compelling need for LNG

I urge you to deny the air quality permit.

/s/
Joe Lopez
2208 N Bristol St.
Tacoma, WA 98406

1819-1 22. General Opposition

From: Susan Lord
To: Public Comment
Subject: Stop LNG plant
Date: Tuesday, November 20, 2018 11:59:51 AM

I'm shocked you would even think of going ahead with this project.
Don't waste taxpayer money on technology that will be shut down before it is completed.
Use our taxes and future taxes on cheaper, clean energy

Global warming is real and we have to invest in solar, wind, tidal sources.

This LNG plant will only worsen global warming

Thank you Susan Lord

Steve: Thank you. Shirley Low?

[05:43:00]

Shirley: Hi. Thank you for being here this evening and providing this opportunity for me to comment. I'm Shirley Low and a resident of Tacoma for 25 years. I'm here to give comment as a stakeholder. A stakeholder in the air that we breathe, in the waters that flow in our community, in the land on which we walk. I'm also a stakeholder, the same as my fellow community members, who deserve a seat at the table equal to the seat Puget Sound Energy and other corporations enjoy.

The executive summary of the draft SEIS states that it informs the public and decision makers of the proposed actions' potential impacts related to the emissions of greenhouse gas emissions. However, the draft SEIS does not take into account the full lifecycle of the GHG emissions for LNG.

[05:44:02] It does not use the latest available science, excuse me, the best available science in its analysis and conclusion. It uses old 2007 IPCC data, instead of using 2016 data. That makes a big difference in the outcome of how this report has concluded. There are also several other areas where the draft is incomplete or based on inappropriate or flawed assumptions. The draft, for instance, assumes all of the fracked gas for this project will be sourced from British Columbia. It is unrealistic to deem that is the only source for the next 25 or 50 years. And that's really what this is looking at.

To use a football analogy, there's no forward movement on an incomplete pass.

[05:45:00] The ball is returned to a starting point. Likewise, the draft SEIS and the LNG project should not move forward. The draft SEIS should be returned to its starting point using the best available science and reissue a complete draft, without flawed assumptions and then, another public comment period. I have several other points that I will submit in detail in writing. So, I will wrap up and just say sometimes, interim steps to a so-called better solution changes the packaging, while the basic ingredients remain the same. LNG is a fossil fuel with GHG emissions dressed in a green wrapper. It is not a step in the right direction. Thank you very much.

1215-1 22. General Opposition
1215-2 11. LCA Inputs and Assumptions - General
1215-3 13. LCA Inputs and Assumptions - Natural Gas Source

From: Lorie Lucky
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 11:11:20 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Lorie Lucky
lorie916@gmail.com
28313 Redondo Way S.
Des Moines, Washington 98198

2251-1 10. LCA Calculations
2251-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2251-3 10. LCA Calculations
2251-4 13. LCA Inputs and Assumptions - Natural Gas Source
2251-5 11. LCA Inputs and Assumptions - General

1542-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1542-2 22. General Opposition
1542-3 3. Outside of SEIS Scope

From: Bernedine Lund
To: Public Comment
Subject: Comment on PSE LNG facility in Tacoma
Date: Wednesday, November 21, 2018 11:19:11 AM

1 - Methane leaks create health and environmental risks that are too high. Several recent articles in newspapers and magazines report that methane leaks happen, e.g., Washington Post reported on the 112 day long leak at the Aliso Canyon facility that released about 5 billion feet of methane into the air, making it the second largest leak on record, equivalent to the annual exhaust emissions from about 600,000 cars.

Methane also leaks during the production, delivery, and use of natural gas. There are reports that methane leaks exceed the projected 4% and in places go up to 11% and more. Those in the industry know that methane is up to 25 times more potent than CO2 as a greenhouse gas, even though it dissipates more quickly than CO2. We cannot trust PSE when they say that their pipeline leaks only 1%.

An independent evaluation of the methane leakage needs to be done on the PSE pipeline. PSE was also responsible for the pipeline that exploded in Seattle several years ago, indicating that PSE's maintenance of the pipeline is inadequate.

Because of these leaks, the LNG facility along with the procurement of methane from Canada may negate much of the greenhouse gas benefits we think we're getting when we use natural gas instead of other fuels.

2 - Going after another non-renewable energy source keeps money and effort from going toward the development of renewable energy sources such as wind and solar. PSE has to know that the production of fracked gas creates more air pollution than burning the gas saves. It doesn't matter that the fracking is done in British Columbia – we all breath the same air and have to deal with the side-effects. Using fracked gas is an example of PSE going after a short-term goal rather than investing in long term renewable resources.

3 – The south Puget Sound region is fighting an exponential increase of airline toxins, particularly those of jet fuel from the expansion of Sea-Tac operations. Studies are published every few weeks that toxins released from the burning of jet fuel are harmful to residents. There is strong opposition to the Sea-Tac operations and the negative effect on the public, and the addition of the pollution from the LNG plant adds to that pollution. It does not matter that Sea-Tac is in King County and the LNG plant is in Pierce County. Residents in the area breath the same air and are exposed to the same air pollution. It would be unfortunate for PSE to change only when there are law suits or legislation requiring change. The legacy of PSE will be the same as that of other companies that look at only immediate gains and do not take into account the long-term health effects of their actions. PSE will then become associated with tobacco companies (increasing lung cancer rates), asbestos companies (increasing mesothelioma), and Monsanto (with agent orange creating far reaching environmental and human health problems).

Bernedine Lund

1611-1 10. LCA Calculations

From: Johanna Lundahl
To: Public Comment
Subject: Please deny the permit for the Tacoma fracked gas plant
Date: Monday, November 12, 2018 8:19:03 PM

Hello Puget Sound Clean Air Agency,
I'm writing today to ask that you do not grant the required permits to complete construction on the liquified natural gas plant on Puyallup land. For one thing, the current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have “placeholder” values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
It is vital that this process is carried out with all of the required information for the public and the PSCAA to make the most informed decisions, and if the company has not done it's due diligence to have the information required to submit a completed report, than they should not be granted the permit they want.
All the best,
Johanna Lundahl

1612-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Johanna Lundahl
To: Public Comment
Subject: Please deny the permit to finish building the liquified natural gas plant in Tacoma
Date: Monday, November 12, 2018 8:11:39 PM

I write today to respectfully ask that the LNG plant in Tacoma not be allowed to complete construction on the grounds that the data used in the report to calculate methane's impact on global warming was out of date. According to the recent IPCC report on climate change, Methane has a much higher impact on global warming than previously thought, and that makes the environmental impact of this plant, much greater. If you use the most recent 2016 data on the global warming potential of methane, you must acknowledge that methane is 32 times more potent than carbon dioxide, and that makes the use of it dirtier than the dirtiest fossil fuels. Please use accurate data in your reporting, and acknowledge it's true meaning.
Sincerely,
Johanna Lundahl

1742-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 10:17:34 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

As a mother, air quality in our region is of the most importance to me and it is unacceptable to sacrifice safety for this dirty energy.

Sincerely,

Shannon Lynn
shannonlynndiana@gmail.com
98407

Tiffany MacBain
tamacbain@gmail.com
916-803-1207

Remarks – Puget Sound Clean Energy Agency Hearing, Oct. 30, 2018

Hello. I am a resident of Tacoma, and my professional training is in textual analysis. I have reviewed your Supplemental Impact Statement and found your packaging of the data and your conclusions to be seriously misleading. I ask that you revisit the report to account for the full climate impacts of housing a greenhouse-gas producing LNG facility within a mile of a city center, residential areas, and one of the largest immigrant detention centers in the U.S.

You report that replacing "other fuels with LNG" at the Port of Tacoma would result over time in "greater...overall reductions in [greenhouse gas] emissions," but you do not take into account the full impacts of fracked gas on the climate and the residents of the communities directly and indirectly impacted by the devastating practices of extraction and export of methane gas. Many of these impacts are well documented: "fracking" has become synonymous with cancer, earthquakes, and pipeline ruptures. Others are less well known but horribly real, like the connection between pipeline construction and violence against indigenous women and girls.

Your report allows for the fact that the operation of an LNG facility would cause emissions: construction, operational, and downstream, and so many subcategories of emission that you include a glossary of abbreviations for them. Yet you claim that replacing "other fuels with LNG" would result over time in "greater...overall reductions in [greenhouse gas] emissions." Tell me: what of the transport, cooling, warehousing, and transfer of LNG? With paragraphs of contextual information and pages of tables and graphs, your report obscures the fact that you do not consider the near-term effects of methane in our air, or the high rates of leakage in U.S. and Canadian gas systems. Just last week the B.C. pipeline on which you base your outcomes *burst*, causing a national gas shortage.

0446-1 3. Outside of SEIS Scope
0446-2 13. LCA Inputs and Assumptions - Natural Gas Source
0446-3 14. LCA Inputs and Assumptions - Leakage/Slippage

I ask you to consider what will happen to our air, not in some distant, imagined future in which all ships, trucks, and cars are fueled by fracked gas—a future that your report envisions but that is not consistent with *the fossil-fuel-free* future that our lives depend on. I ask you to think about five years from now or twenty years from now, when the LNG facility in Tacoma has been churning out methane, which turns into CO2, poisoning the air that we and our children breathe and exacerbating climate change.

Most of us are here because we love Tacoma. The Puyallup people have been here, as they say, for time immemorial. They are not leaving. We are not leaving. Do you know who needs to leave? PSE and their ill-conceived, greed-driven, fundamentally unsafe LNG facility. Your report must engage with real science on this issue and refuse to obfuscate the results.

1547-1 3. Outside of SEIS Scope
1547-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: tamacbain@everyactioncustom.com on behalf of Tiffany MacBain
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Tuesday, October 30, 2018 5:04:36 PM

Dear Responsible Official,

I am a resident of Tacoma, and my professional training is in textual analysis. I have reviewed your Supplemental Impact Statement and found your packaging of the data and your conclusions to be seriously misleading. I ask that you revisit the report to account for the full climate impacts of housing a greenhouse-gas producing LNG facility within a mile of a city center, residential areas, and one of the largest immigrant detention centers in the U.S.

You report that replacing "other fuels with LNG" at the Port of Tacoma would result over time in "greater…overall reductions in [greenhouse gas] emissions," but you do not take into account the full impacts of fracked gas on the climate and the residents of the communities directly and indirectly impacted by the devastating practices of extraction and export of methane gas. Many of these impacts are well documented: "fracking" has become synonymous with cancer, earthquakes, and pipeline ruptures. Others are less well known but horribly real, like the connection between pipeline construction and violence against indigenous women and girls.

Your report allows for the fact that the operation of an LNG facility would cause emissions: construction, operational, and downstream, and so many subcategories of emission that you include a glossary of abbreviations for them. Yet you claim that replacing "other fuels with LNG" would result over time in "greater…overall reductions in [greenhouse gas] emissions." Tell me: what of the transport, cooling, warehousing, and transfer of LNG? With paragraphs of contextual information and pages of tables and graphs, your report obscures the fact that you do not consider the near-term effects of methane in our air, or the high rates of leakage in U.S. and Canadian gas systems. Just last week the B.C. pipeline on which you base your outcomes burst, causing a national gas shortage.

I ask you to consider what will happen to our air, not in some distant, imagined future in which all ships, trucks, and cars are fueled by fracked gas—a future that your report envisions but that is not consistent with the fossil-fuel-free future that our lives depend on. I ask you to think about five years from now or twenty years from now, when the LNG facility in Tacoma has been churning out methane, which turns into CO_2, poisoning the air that we and our children breathe and exacerbating climate change.

Most of us are here because we love Tacoma. The Puyallup people have been here, as they say, for time immemorial. They are not leaving. We are not leaving. Do you know who needs to leave? PSE and their ill-conceived, greed-driven, fundamentally unsafe LNG facility. Your report must engage with real science on this issue and refuse to obfuscate the results.

Sincerely,
Tiffany MacBain
Tacoma, WA 98407
tamacbain@gmail.com

1818-1 22. General Opposition

From: Carrie Mack
To: Public Comment
Subject: stop fracked gas in tacoma!
Date: Wednesday, November 21, 2018 7:20:44 AM

This needs to be stopped. Save our state.

1485-1 22. General Opposition

From: Craig H Mackie
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:19:45 PM

Name: Craig H Mackie
Email: beachbum@nehalemtel.net
Address: 36300 Pacific Palisades Pl. -
Nehalem, Oregon 97131-9665

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Fracked gas is not the energy of the future. Why put all this time, energy, and money into something that is going to be obsolete in the near future. Spend your money on renewables, not fossil fuels!

Carole: Thank you. Lloyd Madden?

Lloyd: Hi. First off, thanks a lot for listening. I know you guys have an incredibly difficult decision ahead of you. So, my goal is simply to provide a perspective that will enable you to make a better decision. I come to you as a citizen. I don't have the power that you have. You will be making a decision. You have been granted that power. And I have something in front of me that talks about the walk the talk, be good and wise towards the resources given to you, defend the future, prevent reduced risks. So, very important things for the entire world that are entrusted to you. I'm going to try to remember some of this. So, big decision. Change is hard. Change is very hard.

You've heard a lot of information back and forth. And my head is swimming.

[02:55:00] My talk is very different now, based on all of the information. So, what you're actually going to do, I think there's a lot of momentum towards approving this. Things are being built. There's probably a lot of money going towards saying this is a good idea. You've also heard a lot of people very passionately saying, hey, we're nervous about this. So, this potentially represents a big change. Do you guys have it in you to make the decision to not approve this? Does this, all of a sudden, mean that this port is no longer competitive? Potentially. Is the science wrong? Potentially. What are the alternatives we're dealing with?

Lisa made a very good point up there of saying it's a step in the right direction. The question is is the step big enough? How much time do we actually have? We don't know that. So, let's look at the alternatives. What if the science that a lot of people are saying here is wrong, and we have more time?

[02:56:00] Well, then, we're going to clean things up a little sooner than we needed to. But what if it's right, and you have to make the decision? So, what if you make the decision to go forward with this, and the science is right, and it's a big problem? So, I'll leave you on the note of people are willing to incur the pain of saying this is not a big enough step. I'm making all kinds of changes. Other people are making changes. The power of an idea that's time is right is very impressive. You make this stand, the world will notice, and you will be rewarded for that. Thanks a lot.

1971-1 23. General Support

From: rex mad
To: Public Comment
Subject: LNG Plant in Tacoma
Date: Tuesday, October 30, 2018 6:07:51 PM

I would like to add my comment and my opinion for consideration during the up coming public information period. Iam not a member of any political action committee, Iam a pierce county resident and concerned about climate change.

After researching LNG plants and the need to reduce green house gasses I have come to the opinion that the construction of the LNG plant should proceed. The amount of co2 released by commercial cargo ships makes them the 6th largest emitter of this green house gas in the world. Shipping companies want to convert to LNG but they must be able to refuel. The future of the Port of Tacoma which is a regional asset must be considered. Although natural gas is a fossil fuel it is far less polluting than the bunker oil now used, If the port authority and the Tacoma council do not build this facility the future of the port as a viable working port is in doubt as as is the revenue and jobs the port creates.

I don’t have a T shirt with a slogan but I appreciate the opportunity to be heard, thank you

William R. Maddox
rexmad@msn.com

0450-4 22. General Opposition
0450-4 8. No Action Alternative
0450-4 3. Outside of SEIS Scope
0450-4 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Suzanne L. Mager

Address or email SLM2@georgetown.edu

I am a PSE customer in Olympia and Vashon. (2 accts.)

I oppose the LNG terminal. I worked on LNG permitting ~~for~~ related to a terminal in southern Calif. in the late 1970s. It was ultimately not permitted. A few years ago I threw away all my files and information on the topic because I was confident no one would be so foolhardy as to propose another LNG terminal in the current economic and environmental climate. Certainly not in a location prone to earthquakes and significant sea rise.

The LNG terminal should not be permitted. Its impact

on the air and resultant increased temperatures would be devastating to Western Washington and beyond.

The terminal operations pose a grave risk to workers and the community, and the consequences of explosion and leaks need to be part of the Clean Air Agency's decision making & analysis. As does the air impacts from fracking to ship.

PSE has already demonstrated its bad faith by beginning construction without the required permitting and without resolving its dispute with the tribe. There is no reason to believe they will adhere to any protective regulations.

Although this is likely not anything the Clean Air Agency can consider, I am outraged that I as a ratepayer have to pay for a foreign corporation's (PSE's) project to enrich its investors and partners at the expense of my health, safety, and environment. As well as the realestate value of my home on Vashon.

2062-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am extremely concerned about how fracking gas can increase climate change.

When methane is leaked directly into the atmosphere, it is 36 times more powerful at trapping heat than carbon dioxide when its impact is averaged over a 100-year period.

Over a 20-year period, methane's heat-trapping impact is 87 times more powerful than that of carbon dioxide.

Climate change is not being debated here. We accept that Washington state is already impacted by climate change.

Considering the above information regarding methane, please reject both the Tacoma LNG facility and Methanol refinery proposals.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Millie Magner	Email:	milliemagner@gmail.com
Address:	4228 28th Place West	Phone:	206-283-3451

2064-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the health and safety impacts of fracking which includes, but is not limited to the following:

- Contaminated groundwater from fracking
- Earthquakes from fracking
- Explosions due to leaking pipelines and storage facilities
- Nitrogen oxides and other air pollutants from smokestacks at end-use facilities
- Upstream emissions of traditional air pollutants, such as smog- and soot-forming volatile organic compounds and air toxins such as benzene, a known carcinogen

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Millie Magner	Email:	milliemagner@gmail.com
Address:	4228 28th Place West	Phone:	206-283-3451

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101

November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) Tacoma, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

2194-1 22. General Opposition

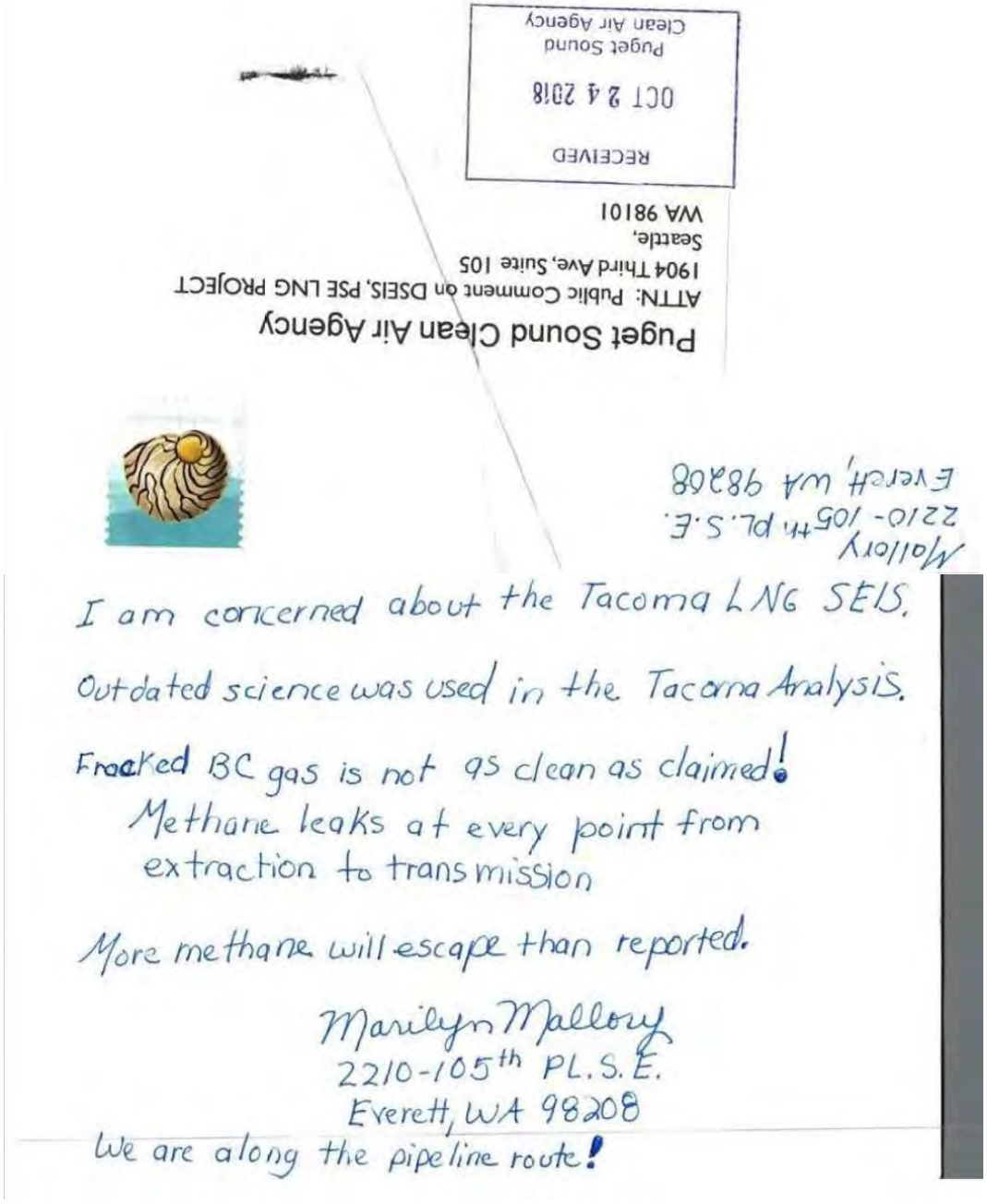
From: madkisson@everyactioncustom.com on behalf of Michele Mallari
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Monday, October 22, 2018 5:42:45 PM

Dear Responsible Official,

Let's wait to know the details. In the meantime, let's work on clean energy alternatives.

Sincerely,
Michele Mallari
Sequim, WA 98382
madkisson@evergreenhomeloans.com

0818-1 13. LCA Inputs and Assumptions - Natural Gas Source



Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

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Mallory
2210- 105th PL. S.E.
Everett, WA 98208

I am concerned about the Tacoma LNG SEIS.

Outdated science was used in the Tacoma Analysis.

Fracked BC gas is not as clean as claimed!
Methane leaks at every point from extraction to transmission

More methane will escape than reported.

Marilyn Mallory
2210-105th PL.S.E.
Everett, WA 98208
We are along the pipeline route!

0309-1 22. General Opposition
0309-2 3. Outside of SEIS Scope

Mike Mallory
2210 105th Pl SE
Everett, WA 98208



Please deny permits for the Tacoma LNG Plant.

(1) Fracking pollutes the air with methane

(2) Methane is a powerful greenhouse gas

(3) Fracking creates health problems and water pollution at the point of extraction.

Michael Mallory

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

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2546-1 22. General Opposition
2546-2 3. Outside of SEIS Scope
2546-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2546-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2546-5 7. SEPA Alternatives
2546-6 7. SEPA Alternatives

From: charm71@everyactioncustom.com on behalf of Charlotte Maloney
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 3:04:28 PM

Dear Responsible Official,

I strongly oppose the LNG project proposed by Puget Sound Energy and Tote Marine.

Such a project only digs our west coast deeper into the fossil fuel pathway, which we need to replace with clean energy sources. Instead we need to urgently move away from fossil fuels.

Fracked gas is not a lesser evil. I understand that methane's impact on the climate continues to evolve- fracking allows more methane escapement than we had previously knew. The impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood. You must take this fact into your decision about this project.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I join others urging you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Charlotte Maloney
Eugene, OR 97405

charm71@comcast.net

1970-1 23. General Support

From: Emily Manning
To: Public Comment
Subject: LNG Plant Comment
Date: Monday, November 19, 2018 2:30:56 PM
Attachments: LNG Plant Comment.pdf

To whom it may concern,

Please see attached letter of public comment for the LNG plant.

Regards,

Emily

PATRIOT FIRE PROTECTION INC.
EMILY MANNING, CPA - CONTROLLER
D 253.284.3531 | C 253.988.9115 | EMILYM@PATRIOTFIRE.COM
2707 70TH AVENUE EAST | TACOMA, WA 98424 | P 253.926.2290 | F 253.284.3532

PATRIOT FIRE PROTECTION, INC.
Fire Sprinklers Save Lives!
2707 70TH Avenue East
Tacoma, WA 98424
TEL: (253) 926.2290
FAX: (253) 922.6150

November 19, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

To Whom it may concern:

I am writing to you today as a resident of Tacoma and as President of Patriot Fire Protection. Speaking for 250 of our employees here in the Northwest, we have been installing quality fire protection systems for Northwest facilities for over 25 years. Our work includes significant amounts of installed fire sprinklers and other types of similar suppression systems in over 300 million square feet of facilities throughout the region.

Patriot Fire Protection considers itself a leader in our industry, we understand and protect against varied hazards, whether storing highly combustible materials in a warehouse, fire control in a 50 story Hi-rise in Seattle, or Special Hazard protection for unique manufacturing facilities. I have watched Puget Sound Energy's attempt to build a Liquified Natural Gas (LNG) facility and TOTE Maritime's innovative and environmentally friendly initiative to convert its Alaska bound ORCA class vessels to LNG very closely after the last year. Fire Protection is not an unresolved concern.

From a Fire Safety standpoint, The National Fire Protection Association has written Standard 59A. The specific standard was written for the sole purpose of providing fire safety for "The Production, Storage, and Handling of Liquefied Natural Gas". The Origin of 59A goes back to a technical committee dealing with the risks associated with LNG, they first met in 1960. The standard has been updated over a dozen times in the last 50 years and has now been adopted into the National Fire Codes. By comparison, NFPA Standard 70 is our National Electric Code. I would urge the Puget Sound Air Agency to follow the extensive data, analysis, and engineering that has been completed. The City of Tacoma has completed an Environmental Impact Statement that includes all extensive analysis of the safety of the LNG facility. In addition, the City of Tacoma Fire Department commissioned an additional independent safety review of the facility done by Braemar, a widely respected safety firm that further evaluated the design, siting, and overall safety of the facility. The analysis concludes: "The technical review of Tacoma's LNG fire and safety systems did not reveal any fatal flaws or visible design deficiencies. Tacoma LNG

PATRIOT FIRE PROTECTION, INC.
Fire Sprinklers Save Lives!
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FAX: (253) 922 6150

was designed to applicable codes and standards with significant attention to detail, a perceived objective of becoming a best in class LNG Facility." Put simply, this facility is being built to the highest standards in the industry with State-of-the-art safety standards.

As a fire protection professional, it is important that we take every step to ensure the safety of the facility, but it is irresponsible to ignore data, science, engineering, and simply "shout out" false assumptions on the safety of the facility. In our day to day lives, there is nothing we do that is risk free. However, I praise the City of Tacoma for going the extra mile to seek an independent review to address safety issues of the LNG facility. Now it is time to follow the data and issue all the permits necessary to get the LNG facility operational.

Tacoma and Pierce County benefit a great deal with the construction of the LNG facility and TOTE's conversion to LNG fueled ships. We stay competitive in the world shipping market and we improve our local air and water quality. Let me close with the environmental data to date:

100% reduction in Sulphur Oxides
99% reduction in Particulate Matter
90% reduction in Nitrogen Oxides
13.5% overall reduction in greenhouse gases as outlined in your draft Supplemental Environmental Impact Statement.

Again, I would urge you to follow the data, the science, and engineering analysis. This process has gone on way too long and the delays in issuing all the appropriate permits flies in the face of the data. What will we be telling the larger community and all current and future businesses interested in innovation by providing environmental leadership if we say no after all the data and merits say yes.

Thank you for considering my comments.

Sincerely,

James Boulanger

President,
Patriot Fire Protection

HANFORD, WA OFFICE
TEL: (509) 373-8895
FAX: (509) 373-8919

VANCOUVER, WA OFFICE
TEL: (360) 699.4403
PORTLAND: (503) 222.6001
FAX: (360) 699.4485

SPOKANE, WA OFFICE
TEL: (509) 926.3428
FAX: (509) 926.3708

PATRIFPO99CF

1644-1 3. Outside of SEIS Scope

Mahoney, Melisa

From: susan manning <smanning209@yahoo.com>
Sent: Monday, November 19, 2018 6:22 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Hello,

I am writing to ask the Clean Air Agency *not* to allow a permit for the PSE LNG project in the Tacoma tide flats.

I am deeply concerned about the safety for people and the animals that will be affected by the project, as well as the environmental impact, and believe that there isn't enough reason to warrant the risks involved.

This is a seismically active area and experts say that we are due for a major earthquake. I do not have confidence that PSE can guarantee that the LNG plant will not add to the catastrophic effects of such an earthquake. I look at so many other industrial plants for which there must have been assurances that they were safe and yet they contributed greatly to terrible events that occurred, the Fukushima Power Plant failure comes to mind.

Also, the Puyallup River is one of the threatened rivers on the USGS "Mount Rainier Lahar Hazard Map." Although there would probably be signs of an impending Mt. Rainier volcanic eruption, lahars can happen apart from such eruptions, with absolutely no warning, and they are extremely quick. This could be quite devastating downriver in the Port of Tacoma; has PSE planned for this and if so is it possible to absolutely guarantee that the LNG plant will not be compromised? Could there be an explosion or a leak into the atmosphere?

Saches, mini-tsunamis, if you will, also occur in the Puget Sound area; can we be guaranteed that a sache in the Tacoma tideflats would not cause damage to the LNG plant, and consequent disastrous effects in the local area?

How will this plant affect the salmon, and, downstream, the marine animals in Puget Sound? It cannot be good for them and the risk for them is huge. I have not yet studied this aspect of the plan, but it's my understanding that a large amount of water from the Puyallup River will be used for the LNG plant (for cooling purposes?); this surely will have a negative impact on the struggling salmon population and consequently on the struggling Orca population.

As for the question of explosions, this is controversial. The Tacoma Fire Dept. does not seem to be concerned about this possibility and yet it does appear that LNG vapor can explode (I read this here: http://www.energy.ca.gov/lng/faq.html#700).

After attending the most recent public hearing (I have not been able to get to any of the others) I was alarmed to hear of the methodology regarding the impact of methane in the local area. I was already dead-set against this project but to hear of the questionable methodology is particularly alarming.

I understand that TOTE needs to meet emission requirements and that they are looking for a way to do that, but it makes no sense fulfill a requirement designed to protect the health of people and the environment by setting up another situation in which there is immense risk to people and the environment. I believe there are other methods that TOTE could employ to meet the emission requirements.

Please, please, I beg you to put public and environmental safety first and don't approve the PSE LNG project. No risk is acceptable in such an unstable, volcanically threatened, populous and sensitive area. It is our generation that knows better and can act; please do not allow this additional threat to the health of the people, animals, and environment that are within and nearby the Tacoma tide flats. We turn to you as our last protection from this threat.

Thank-you for your attention.
Sincerely, Susan Manning, 253-879-1176, 3141 N. Mullen St., Tacoma 98407

1350-1 22. General Opposition

From: Juliette Manuel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:16:24 PM

Name: Juliette Manuel
Email: julsm5@hotmail.com
Address: 118 SW 212th Ave -
Beaverton, Oregon 97006

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

No cracking should be allowed and endangering our community and the environment.

1965-1 23. General Support

From: John Marcantonio
To: Public Comment
Cc: ahofeling@totemaritime.com; William Roberts; Marjorie Zoretic
Subject: Letter of Support_TOTE_LNG.pdf
Date: Wednesday, November 21, 2018 12:53:25 PM
Attachments: image001.png
Letter of Support_TOTE_LNG.pdf

Good Day Puget Sound Clean Energy,
Attached my letter of support to allow PSE to move forward with LNG project in Tacoma.

Always Safe.
JP

John P. Marcantonio | jp@foss.com
Foss Maritime Company
450 Alaskan Way South #706 Seattle, WA 98104
T: +1 206-270-4848 M: +1 206.384.7436 (Preferred)
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John P. Marcantonio

206.384.7436 | john.marcantonio@gmail.com | 810 NW 57th St Seattle, WA 98107

11/16/2018

PSCAA
ATTN: Public Comment
1904 3rd Ave, Suite 105
Seattle, WA 98101

Dear PSCAA:

I am writing to express my support for the environment by advocating approval for the facilities permits for Puget Sound Energy, which will enable TOTE Maritime Alaska to convert their ORCA Class Vessels to LNG.

I work for Foss Maritime Company as the Sr. Director of Operations, and formed and led the team that operates the first LNG tank barge in North America, the *Clean Jacksonville*. I have observed first-hand TOTE's commitment to safety and the environment as they have worked with local officials and the United States Coast Guard to safely operate the two LNG Marlin Class Vessels which service Puerto Rico. TOTE has recognized the impact that human activity has had on our environment and is demonstrating industry strategic leadership through their desire to be good stewards of the environment.

LNG has been safely handled over the last 45 years, and the industry has maintained an enviable safety record. LNG vessels have traveled more than 128 million miles during the past 45+ years and have made more than 105,000 LNG carrier voyages without major accidents or safety problems, either in port or at sea. Furthermore, the SEIS study cited the environmental benefits of converting to LNG which include:

- 100% reduction in SOx
- 99% reduction in particulate matter
- 90% reduction in nitrogen oxides
- 13.5% reduction in greenhouse gases

LNG is a safe, proven fuel. If LNG is not available at the Port of Tacoma, the only viable alternative would be for Alaska-bound cargo vessels to utilize diesel fuel, which burns much less cleanly than LNG, and would exacerbate the harmful effects of climate change. For the sake of our posterity, please issue Puget Sound Energy their permits on schedule so that TOTE can start utilizing LNG.

Sincerely,

John P. Marcantonio

Steve: Okay. Next up is Jamie Margolin. Jamie Margolin?

Jamie: I know you've heard a lot of people talk today, but I need you to listen to me and listen to what my friend, Zoe, just said because we are the youth, and we are the ones who your decisions are impacting. My name is Jamie Margolin. I'm 16 years old. I'm a junior in high school. And I am taking time out of school and homework not because I am paid to do so or because I have to be here, but because my life depends on it.

[03:42:00] Because my entire generation and all future generations depend on me stopping you from making a huge, reckless mistake. The building of the liquid natural gas plant needs to stop immediately because it is criminal to my generation. Continuing to construct and let this plant open is not just breaking any old law, it is directly against the constitution. I know my rights. We Americans have the right to life, liberty, and the pursuit of happiness. And in the constitution in the state of Washington, there is this thing called a public trust doctrine.

It states that young generations have the rights to the natural resources of the state that we need in order to live. And by going through with the construction of LNG plant, you are destroying the environment for my generation and locking in decades more of climate change into Washington State, poisoning the air, poisoning the water, and securing a dirty fossil fuel future, instead of the clean energy future my generation deserves.

[03:43:00] The first step to getting out of a hole is to stop digging. And, in terms of climate, it means to stop digging for fossil fuels. Stop burning fossil fuels, whether it be coal, oil, or this disgusting, earth warming fracked gas that people are claiming to be clean, even though it's the same old pollution. Every day, I am afraid. As a young person growing up in this world wrecked by climate change, it's hard for me to plan my future without worrying whether the earth is still going to be livable by the time I'm older. So, please, listen to the cries of your children and halt LNG construction now.

1736-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 10:30:01 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution.

Sincerely,

Dobrila Marinkovich
potterling@gmail.com
98406

2074-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

There is no good way to transport fracked gas through our communities and natural areas. Whether it's by rail, train, or boat, there are safety and environmental risks that are not worth the benefits. The path we are on is not sustainable for our planet, wildlife, or future generations of humanity. A correct accounting of all costs would make fracked gas an uneconomical choice. Can PSE truly show otherwi

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Don Marsh	Email: don.m.marsh@gmail.co
Address: 4411 137th Ave SE	Phone: 425-249-2791

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2075-1 3. Outside of SEIS Scope

I am concerned about the effects on water from fracking. Fracking requires a lot of water, which is mixed with toxic chemicals. Some are left in the ground, which may cause problems decad from now. Some of the water comes back to the surface, where treatment is inadequate. Water is a precious resource, essential for life. Fracked gas is not essential, and the damage and pollution is not properly assessed economically.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Don Marsh	Email: don.m.marsh@gmail.co
Address: 4411 137th Ave. SE Bellevue, WA 98006	Phone: 425-749-2791

Dear Puget Sound Clean Air Agency,

2076-1 3. Outside of SEIS Scope

I am concerned about the health effects of leaked methane and other pollutants from gas fracking. I just learned that over 15 million Americans live within one mile of a fracked gas well head. Who knows what kind of health problems may arise in the future?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Don Marsh	Email: don.m.marsh@gmail.com
Address: 4411 137th Ave. SE Bellevue, WA 98006	Phone: 425-749-2791

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2077-1 3. Outside of SEIS Scope

I am concerned about the climate impacts of methane emissions from fracked gas. It appears that it might be worse than coal, according to measurements done by researchers from Cornell. This could be bad for our global climate!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Don Marsh	Email: don.m.marsh@gmail.com
Address: 4411 137th Ave. SE Bellevue, WA 98006	Phone: 425-749-2791

ear Port of Kalama, and Cowlitz County,

ear Puget Sound Clean Air Agency,

I am concerned about the increasing percentage of fracked gas in our production of natural gas. This is a concern, because fracking has much harsher ecological effects than previous extraction methods - higher use of water, more chemicals, and higher emissions of methane. If natural gas really ever was a "bridge fuel" to renewables, fracked gas most definitely IS NOT!!

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Don Marsh	Email: don.m.marsh@gmail.com
Address: 4411 137th Ave. SE	Phone: 425-749-2791

2078-1 3 Outside of SEIS Scope

2078

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2061-1 6. Purpose and Need

Both the backers of the LNG facility and the Methanol Refinery have used the rationale that they are displacing coal, oil or bunker fuels as a platform for greenwashing. It's more likely that these projects will add to fossil fuel use, rather than displace it. In the case of Methanol, we know fracked gas is at least as harmful to the environment as coal, when lifecycle emissions are considered. The SEIS docs need to focus on the added envir impacts of the proposals without assuming they will displace other dirty fuels.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Ruth Marsh	Email: ruthmarsh@live.com
Address: 4411 137th Ave SE Bellevue WA 98006	Phone: 425-502-8279

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2072-1 3. Outside of SEIS Scope

fossil fuel companies seeking to fast-track the permitting process have a history of stating they will not operate at full capacity, and convincing permitting agencies to study on the envir impacts of the refinery operating below capacity. We need to know the FULL envir impacts of the refinery operating at FULL Capacity. Ensure permitting agencies study the envir impacts of the project operating at FULL CAPACITY

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Ruth Marsh	Email: ruthmarsh@live.com
Address: 4411 137th Ave SE Bellevue, WA 98006	Phone: 425-502-8271

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2080-1 3. Outside of SEIS Scope

By increasing the demand for natural gas in NW these projects will increase the demand for fracking. 2/3 of all "natural" (nothing natural about it) gas in the US is fracked. Fracking damages public health, pollutes water, and contributes to climate change. The SEIS must include the environmental impacts associated w/ continued and increased fracking

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Ruth Marsh	**Email:** ruthmarsh@live.com
Address: 4411 137th Ave SE Bellevue 98006	**Phone:** 425-502-8279

1718-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 2:54:49 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

They say is not dependable. It is well known that fracked gas leaks greatly and dangerous. Remember the faucet water throwing flame. Fracking causes earth quakes also. Fracking should be banned period. Too many reasons to go 100% alternative energy for the future.
r8dmarshall

Sincerely,

David Marshall
davidmarshall1@verizon.net
34652

From:	Erin Marshall
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Monday, November 19, 2018 8:04:17 PM

Name: Erin Marshall
Email: erin@kismet-design.com
Address: 5736 NE 29th Ave -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

At this point, we know that the Trump Administration, installed the corrupt and incompetent Scott Pruitt as head of the EPA, Trump also installed the corrupt and incompetent Ryan Zinke as secretary of the interior and all systems are "GO" on giant poorly planned and ill-conceived fossil fuel projects all over the nation.

Projects like the Tar Sands Pipeline, uranium mining near the Grand Canyon, shrinking Bears Ears for drilling and mining and building a methane plant on the Columbia River. All these projects double down on faulty slip shod biased "data" that any reasonable body would reject. Specifically, the information in the SEIS proposal is incorrect because it is too old, the conclusions are are faulty because the information is vague and biased in a way towards the fossil fuel industry such that it is insulting to people who are are not in the pockets of the fossil fuel industry.
- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96. - The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG.
One of the reasons the citizens of the United States elected a democratic wave of congresspeople back into office was precisely this kind of corrupt abusive, anti-science anti common sense project that will pollute the region, cost billions and only further our dependance of outdated, dangerous and ultimately deadly technology.
Please re-think this plan and call it what it really is: a give away to the billionaires that do not seek steward ship of our beautiful planet; rather they would sell it out for profits... which in the end will kill us all.

1532-1 22. General Opposition
1532-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1532-3 6. Purpose and Need

Carole: Thank you. And Diane Martin?

Diane: Hi. My name is Diane Martin, and I'm a resident of Tacoma. The International Marine Organization, the IMO, mandated by January 1, 2020 that marine vessels redesign their ships to use a less sulfur fuel.

[02:57:07] They offered different options. But the fuel that they seemed to push was called liquified natural gas, LNG. Now, I applaud IMO's efforts to prevent and control pollution from ships. However, I feel this organization is out of step with regards to reducing greenhouse gas emissions through the use of LNG, as a better fuel option for marine vessels. Yes, LNG will burn cleaner, as an end fuel for ships. But that being said, LNG is not cleaner, is not greener in the long run. As you know, liquified natural gas is, basically, methane. It is a fossil fuel. In over a 20 year period, natural gas produces more greenhouse gas emissions than carbon dioxide.

[02:58:03] You are aware that the most recent intergovernmental panel on climate change study paints a grim picture of what our world will look like, in a very short period of time, if we do not address greenhouse gas emissions. LNG fuel to power the shipping industry is not in step with a global solution to climate change. Much of LNG produced today is from a process called fracking.

It is expensive, pollutant driven, and because it is a fossil fuel, it has a limited value as a fuel source and will become more costly and deadly in the future because the leaks of methane along the thousands of miles of pipeline only cause more harm to water supplies, in our air and threatens the health of millions of citizens along with animals and plant life.

[02:59:00] Plus, there is another matter that needs to be addressed with this project. It is the concern by the Puyallup Nation that this project is not in step with Medicine Creek Treaty of 1854. We must honor their wish to not see this project go forward. So, I would ask the PSCAA to create a pause in this process, in order to allow global citizens to confront the fallacy of the IMO's use of LNG as a source of marine fuel and plus the local issue of the Puyallup Nation's desire not to allow this project on their land. Thank you.

Carole: Thank you. So, it is 5:00. So, if everybody could please leave the auditorium. And, actually, I think they're going to lock the outer doors of the building until 6:30. The hearing will resume then.

From: Diane Martin
To: Public Comment
Subject: Re-submit comment
Date: Tuesday, October 30, 2018 9:26:07 PM
Attachments: Puget Sound Clean Air Agency.docx

Hello,

I'm so sorry. I submitted my comment earlier today and found I had made a mistake. I used the word "methanol" when I knew the word I should have used is "methane". I apologize for this error. Therefore, I re-submit my comment as attached.

Diane Martin

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

October 31, 2018

I am writing in regard to the January 1, 2020 mandate to reduce greenhouse gas emissions (GHG) by marine vessels to .50 percent mass by mass(m/m). My understanding of the International Marine Organization (IMO) proposal to reduce Greenhouse Gas (GHG) emissions is to mandate marine vessels to redesign their ships to use either a less GHG fuel then the current use of diesel or oil, or for the use of "scrubbers" that would produce less GHG. The fuel that IMO seems particularly interested in is liquefied natural gas (LNG).

The IMO Mission Statement states "The Mission Statement of the International Maritime Organization (IMO) as a United Nations specialized agency is to promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This will be accomplished by adopting the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through consideration of the related legal matters and effective implementation of IMO's instruments with a view to their universal and uniform application".

I applaud IMO's efforts to prevent and control pollution from ships. However, I feel this organization is out of step with regards to reducing GHG through the use of LNG as a better fuel option for marine vessels. Yes, LNG will burn cleaner as an end fuel for ships. That being said, LNG is not cleaner or greener in the long run. As you know, liquefied natural gas is basically methane. It's a fossil fuel. Over a 20 year period, natural gas produces more GHG emissions than carbon dioxide.

I'm sure you are aware of the most recent Intergovernmental Panel on Climate Change (IPCC) study. This study paints a grim picture of what our world will look like in a very short period of time if we do not address GHG emissions. LNG fuel to power the shipping industry is not in step with a global solution to Climate Change. Much of the LNG produced today is from a process called "fracking". It is an expensive and "pollutant driven" process and because it is a fossil fuel, it has a limited value as a fuel source and will become more costly in the future. Plus the leaks of methane along the miles and miles of pipeline only cause more harm to water supplies, air that becomes contaminated and threatens the health of millions of citizens along with animal and plant life. IMO’s push for marine vessels to use LNG as a fix to reduce GHG is in direct conflict with the IPCC study.

In addition, the IMO statement that the January 1, 2020 deadline cannot be changed is flawed. Why would we seek a push to mandate a harmful fuel that does not allow the industry to forge a zero m/m without harming the environment and humans?

There is another matter that needs to be addressed with this project. It is the concern by the Puyallup Nation that this project is not in step with the Medicine Creek Treaty of 1854. We must honor their wish to not see this project go forward.

I would ask the PSCAA to create a “pause” in this process in order to allow global citizens to confront the fallacy of the IMO’s use of LNG as a source of marine fuel, plus the local issue of the Puyallup Nation’s desire to not allow this project on their land.

Sincerely,

Diane Martin
7322 N. Skyview Pl. E302
Tacoma, WA 98406

From: Diane Martin
To: Public Comment
Subject: Public Comment LNG
Date: Tuesday, October 30, 2018 12:32:22 PM
Attachments: Puget Sound Clean Air Agency.docx

1307-1 7. SEPA Alternatives
1307-2 3. Outside of SEIS Scope

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS PSE LNG Project
1904 Third Avenue, Suite 105
Seattle, WA 98101

October 31, 2018

I am writing in regard to the January 1, 2020 mandate to reduce greenhouse gas emissions (GHG) by marine vessels to .50 percent mass by mass(m/m). My understanding of the International Marine Organization (IMO) proposal to reduce Greenhouse Gas (GHG) emissions is to mandate marine vessels to redesign their ships to use either a less GHG fuel then the current use of diesel or oil, or for the use of "scrubbers" that would produce less GHG. The fuel that IMO seems particularly interested in is liquefied natural gas (LNG).

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I'm sure you are aware of the most recent Intergovernmental Panel on Climate Change (IPCC) study. This study paints a grim picture of what our world will look like in a very short period of time if we do not address GHG emissions. LNG fuel to power the shipping industry is not in step with a global solution to Climate Change. Much of the LNG produced today is from a process called "fracking". It is an expensive and "pollutant driven" process and because it is a fossil fuel, it has a limited value as a fuel source and will become more costly in the future. Plus the leaks of methanol along the miles and miles of pipeline only cause more harm to water supplies, air that becomes contaminated and threatens the health of millions of citizens along with animal and plant life. IMO’s push for marine vessels to use LNG as a fix to reduce GHG is in direct conflict with the IPCC study.

In addition, the IMO statement that the January 1, 2020 deadline cannot be changed is flawed. Why would we seek a push to mandate a harmful fuel that does not allow the industry to forge a zero m/m without harming the environment and humans?

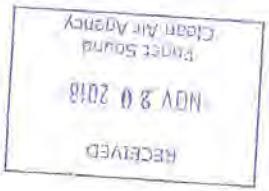
There is another matter that needs to be addressed with this project. It is the concern by the Puyallup Nation that this project is not in step with the Medicine Creek Treaty of 1854. We must honor their wish to not see this project go forward.

I would ask the PSCAA to create a “pause” in this process in order to allow global citizens to confront the fallacy of the IMO’s use of LNG as a source of marine fuel, plus the local issue of the Puyallup Nation’s desire to not allow this project on their land.

Sincerely,

Diane Martin
7322 N. Skyview Pl. E302
Tacoma, WA 98406

1281-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1281-2 3. Outside of SEIS Scope



publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101 November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

1281-2 cont'd 3. Outside of SEIS Scope
1281-3 5. Regulatory Framework

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

1281-3 cont'd 5. Regulatory Framework
1281-4 10. LCA Calculations

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) TACOMA, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

From: Roger Martin
To: Public Comment
Subject: Question on submitting comments
Date: Friday, November 9, 2018 2:42:18 PM

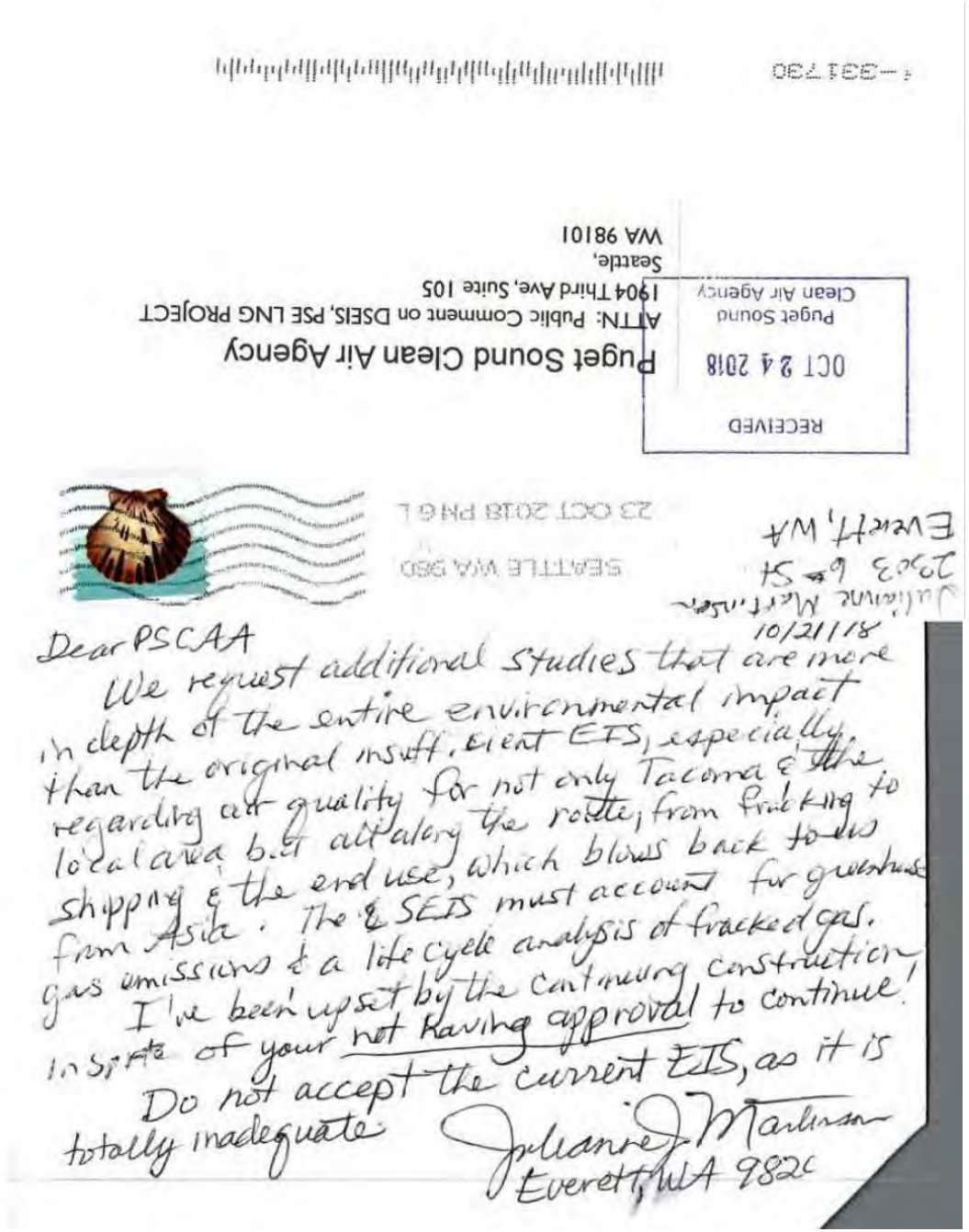
I belong to a church group who has asked me to find out if we may send one comment with multiple signatures, or if each comment needs to be from a single individual. Also, may any one person submit more than one comment, based on being informed by new information gathered since submitting an original comment?

Please advise.

Many thanks,

Roger T Martin
Coordinator for Greening Activity Group
United Church in University Place
(253)569-7793

0811-1 3. Outside of SEIS Scope
0811-2 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0811-3 5. Regulatory Framework



RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

23 OCT 2018 PM 6 L
SEATTLE WA 980

Julianne Marlinson
2903 6th St
Everett, WA
10/21/18

Dear PSCAA

We request additional studies that are more in depth of the entire environmental impact than the original insufficient EIS, especially regarding air quality for not only Tacoma & the local area but all along the route, from fracking to shipping & the end use, which blows back to us from Asia. The SEIS must account for greenhouse gas emissions & a life cycle analysis of fracked gas.

I've been upset by the continuing construction in spite of your not having approval to continue!

Do not accept the current EIS, as it is totally inadequate.

Julianne Marlinson
Everett, WA 9820

1892-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

THIS PROJECT IS IN DIRECT CONTRADICTION TO THE IPCC RECOMMENDATIONS & WILL LEAD TO ADDITIONAL CO_2 EMISSIONS — WE CANNOT AFFORD THESE IMPACTS IF WE ARE TO CONTROL WARMING OF THE PLANET.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: KAHLER MARTINSON Email: martinsonkahler@YAHOO.COM

Address: 10875 NW RAINMONT RD PORTLAND OR 97229

By completing this comment card you agree to receive updates about the project.

1951-1 23. General Support

From: Donald Massie
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, October 26, 2018 9:52:03 AM

Name: Donald Massie
Email: papadonmassie@gmail.com
Address: 9816 Canyon Rd E. -
PUYALLUP, Washington 98373

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I and my family support the LNG Project by PSE on the Port of Tacoma. It is by far one of the safest and eco friendly fuels for the entended use.

1684-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 1:15:29 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Just say no!

Sincerely,

Cassandra Matheney
harvey.sandy79@yahoo.com
42320

1366-1 22. General Opposition

From: Rebecca Matsumoto
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 9:13:49 AM

Name: Rebecca Matsumoto
Email: rebeccalmatsumoto@gmail.com
Address: 16929 NW Arizona Dr -
Beaverton, Oregon 97006

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

A future fueled by fossils will lead to the death of the planet within decades. Cut your losses and give us the clean energy we need to survive. North Carolina flooding, heat waves and droughts leading to California forest fires are just some of the consequences of burning the fossil fuels. That price is too damn high. No more fossil fuels.

1759-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 6:32:23 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I'm an elderly woman who suffers from various breathing difficulties now. The choice of confirming LNG will only exacerbate these issues. As a result ,medical care will increase as will as a need for meds. Most of us seniors AND families on reduced incomes will suffer. I think at that point, lawsuits will be appropriate. On an issue, why is capitalism taking a priority over humans on this planet? When are we going to wake up and begin to care for the planet we call home? Why is a foreign country stealing from the people of Tacoma and surrounding towns and communities. What about our wildlife that depend on us for protections? So many layers of concern. This is the wrong choice at the wrong time.

Sincerely,

Rosalie Mcallister
dockton1@aol.com
98013

1513-1 22. General Opposition

From: Kelly Mcconnell Mcconnell
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:46 PM

Name: Kelly Mcconnell Mcconnell
Email: prvt@2ezgroup.com
Address: 11375 SW Erste -
Tigard, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I want CLEAN air and water and I'm damned tired of begging for them. Fracking is FILTHY, it destroys our drinking water. How stupid and/or corrupt does one have to be to trade clean drinking water for money? That IS the choice here.

0821-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
NOV 9 2018
Puget Sound
Clean Air Agency

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Robert McCormick

Address or email

Having 4 kids, ~~cant~~ doing anything we can to better the environment seems like a no brainer. Don't wait, take steps now to better the future for our kids.

[03:17:12] So, first up, David Bluhm. Come to the microphone up front. David Bluhm here? No. Nathan McCurtain?

Nathan: Oh, good, first. Hi. My name is Nathan McCurtain, and I'm a Tacoma resident and have been a resident of the Puget Sound area, since I was 4 years old. I am asking that this permit be denied and the LNG project be halted because the process has lacked transparency and has failed to meet its obligations to the Puyallup Nation. First, the LNG plant facility is too large for what it's stated usage is.

[03:18:03] And we don't know what they will do with that extra capacity. Next, the SEIS assumes converting marine shipping customers to LNG, but a majority of these buyers have remained unidentified. So, we cannot know the full impact for this facility. Finally, this is the home of the Puyallup Nation and its people. It has been for hundreds of years. Throughout history, Native people have had to fight for respect and the right to live. And this project grossly violates both of those struggles. The tribe was not properly or meaningfully consulted. Obviously, this lack of consultation is because this project is a threat to the Puyallup People's health and their way of life.

We need a more comprehensive SEIS and full consultation with the tribe. Until and unless a comprehensive process has been followed, including the consultation with the tribe and the client, safety, and environmental impacts of this project are accurately accounted for, this project cannot be properly evaluated.

[03:19:00] And the permit should be denied. Do not lock us into a fossil fuel future. Thank you.

1196-1 5. Regulatory Framework
1196-2 19. LCA Inputs and Assumptions - End Use
1196-3 5. Regulatory Framework

1362-1 22. General Opposition

From: katy mcfadden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 10:07:49 AM

Name: katy mcfadden
Email: katytmcfadden@gmail.com
Address: 313 s.w. maricara st. -
portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Pursuit of LNG plants in Tacoma, in Jordon Cove and anywhere and everywhere needs to stop. We are courting suicide with our pursuit for fossil fuel in any form. Let us put our creative energy into looking at sustainable and renewable wind and solar.

1468-1 22. General Opposition

From: katy mcfadden
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 10:24:41 PM

Name: katy mcfadden
Email: katytmcfadden@gmail.com
Address: 313 s.w. maricara st. -
portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Hey! let us shoot ourselves in the foot and screw the following generations - this sounds like madness beyond belief. There is no more wiggle room. Fossil fuel and its planned infrastructure must be stopped. We can not move forward with a reknewable infrastructure when we are caught in battles to stop or change the existing. The existing is destroying the plant. No LNG in Tacome - No LNG in Coos Bay, No LNG - DONE. Let us move into the future.

1602-1 3. Outside of SEIS Scope

From: Kathy McFall
To: Public Comment
Subject: No LNG in Tacoma
Date: Wednesday, November 21, 2018 2:36:06 PM

To Whom It May Concern:

My family has lived in the same house in Federal Way for more than 20 years. We get our water and most of our air from Tacoma. Now I see that our home is within the blast zone of the LNG plant under construction.

Steven Storms and a number of others with extensive understanding of chemical reactions have already submitted vast volumes to anyone who would read them, concerning the hazards of this plant. Having had only a few college chemistry courses, I will leave that to them. I just know I don't want this population center exposed to these chemicals, or the great potential for other disasters this plant will impose. This Puyallup Tribe land is also in an earthquake, lahar and tsunami zone. What could possibly go wrong?

Climate change has been proven. We are feeling the effects of horrific weather and wildfires. Operating a new fracking and natural gas facility would be a gigantic, foolish step backward at best.

Please stop the LNG.

Respectfully,

Kathy McFall-Butler

resident

0362-1 22. General Opposition
0362-2 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name SRENT McFARLANE

Address or email mcfarmer@mac.com

WE ARE PSE CUSTOMERS, WE DO NOT WANT AN LNG FACILITY BUILT IN THE TACOMA TIDE FLATS. PLEASE REVOKE THE PERMIT APPLICATION, THE SEIS IS INCOMPLETE AND FLAWED. THE LOCATION WILL BE HIGH RISK TO A DENSELY POPULATED AREA, ENDANGERING PUYALLUP TRIBAL PEOPLE AND MANY OTHER LOCAL RESIDENTS. WE DO NOT NEED THE LNG TANK BUILT. WE NEED TO TRANSITION AWAY FROM FRACKED GAS AND OTHER FOSSIL FUEL INFRASTRUCTURE PROJECTS. OUR INVESTMENTS IN ENERGY MUST NOW GO TO THE MOST RENEWABLE AND LOW CARBON EMITTING SYSTEMS POSSIBLE. THAT IS THE FUTURE WE WANT.

1560-1 3. Outside of SEIS Scope
1560-2 5. Regulatory Framework

From: Eva Bowen
To: Public Comment
Subject: DSEIS, PSE, LNG Project -Public Comment
Date: Tuesday, October 30, 2018 10:41:45 AM

Dear PS Clean Air Agency,

As a Pierce County resident, I am writing to urge you to draft a new SEIS. Local researchers and scientists have collaborated to confirm that the current draft is flawed. It does not account for the full climate impacts of fracked gas.

First, communities which will be mostly impacted by LNG from the extraction site to the end location are, primarily, low income communities of color and indigenous communities. In Tacoma, within a two (2) mile radius of the LNG project are three majority minority schools, the Hilltop neighborhood, the Detention Center and the Puyallup Tribe. These communities will suffer the most from poor air quality. Numerous First Nations in Canada are suffering the consequences of toxic emissions due to fracking, according to studies not incorporated in PSCAA's draft SEIS.

Furthermore, the proposed LNG project is a direct affront to the Puyallup Tribe, putting their treaty rights and community at risk, first, and disproportionately affected. Tribal Councilwoman, Annette Bryan, says there was never government to government consultation which is in violation of the Medicine Creek Treaty, the supreme law of the land. Please stand with the Puyallup Tribe in opposition to the LNG facility.

With all due respect, I implore you to consider and act in a moral and just way as you make decisions regarding this effort. Many lives depend on it!

Regards,

Eve Bowen

1536-1 5. Regulatory Framework

From: Bonnie McKinlay
To: Public Comment
Subject: Comment: DSEIS PSE LNG Project
Date: Wednesday, November 21, 2018 5:51:40 PM

Dear Puget Sound Clean Air Agency,
Thank you for the opportunity to comment on the DSEIS for Tacoma's LNG Project.
With concern about the **ongoing construction on the project without adequate consultation with the impacted Puyallup Tribe**, I attended the public hearing on October 30th. Listening to testimonies during the afternoon and evening sessions convinced me to question the continuation of the project. It demonstrates lack of responsibility to proceed without further, comprehensive consultation with Puyallup, who will be most negatively affected by the project's completion.

To refresh your memory on some highlights from the hearing, I am including this 5-minute VIDEO LINK HERE.

I urge you to reject the DSEIS in its current form.
Sincerely,
Bonnie McKinlay

1562-2 22. General Opposition
1562-2 10. LCA Calculations

From: Bonnie McKinlay
To: Public Comment
Subject: DSEIS: PSE LNG Project
Date: Wednesday, November 21, 2018 6:21:37 PM

Dear Members of PSCAA,
I comment here on the DSEIS for PSE's LNG project in Tacoma.
I have a number of concerns with the DSEIS, deepest is the very notion of constructing the LNG terminal in the face of **scientific evidence calling for the immediate need to limit, not *expand,* the fossil fuel industry**.
The data used in the DSEIS is out-dated and flawed.
Please do not accept the DSEIS in its current form.

To supplement your evaluation of the DSEIS, I am including this article by Bill McKibben that was issued online today by *The New Yorker*: How Extreme Weather Is Shrinking The Planet. 11/18.

Thank you for consideration of my comment.
Bonnie McKinlay
goto350pdx@gmail.com
7112 SW 53rd Avenue
Portland, OR 97219

From: Bonnie McKinlay
To: Public Comment
Subject: Re: Comment: DSEIS PSE LNG Project
Date: Wednesday, November 21, 2018 6:20:42 PM

Please accept this edited version of my comment. Only change is the inclusion of my contact info:

Dear Puget Sound Clean Air Agency,
Thank you for the opportunity to comment on the DSEIS for Tacoma's LNG Project.
With concern about the **ongoing construction on the project without adequate consultation with the impacted Puyallup Tribe**, I attended the public hearing on October 30th. Listening to testimonies during the afternoon and evening sessions convinced me to question the continuation of the project. It demonstrates lack of responsibility to proceed without further, comprehensive consultation with Puyallup, who will be most negatively affected by the project's completion.

To refresh your memory on some highlights from the hearing, I am including this 5-minute VIDEO LINK HERE.

I urge you to reject the DSEIS in its current form.
Sincerely,
Bonnie McKinlay
goto350pdx@gmail.com
7112 SW 53rd Avenue
Portland, OR 97219

On Wed, Nov 21, 2018 at 5:51 PM Bonnie McKinlay <goto350pdx@gmail.com> wrote:

> Dear Puget Sound Clean Air Agency,
> Thank you for the opportunity to comment on the DSEIS for Tacoma's LNG Project.
> With concern about the **ongoing construction on the project without adequate consultation with the impacted Puyallup Tribe**, I attended the public hearing on October 30th. Listening to testimonies during the afternoon and evening sessions convinced me to question the continuation of the project. It demonstrates lack of responsibility to proceed without further, comprehensive consultation with Puyallup, who will be most negatively affected by the project's completion.
>
> To refresh your memory on some highlights from the hearing, I am including this 5-minute VIDEO LINK HERE.
>
> I urge you to reject the DSEIS in its current form.
> Sincerely,
> Bonnie McKinlay

1487-1 22. General Opposition

From: robin mcleod
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:06:18 PM

Name: robin mcleod
Email: robinm@hevanet.com
Address: 7150 sw Newton pl -
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It is very important that you are listening to public comment on the DSEIS PSE LNG project. This is a destructive and dangerous plan. It puts us all at risk by its construction, by methane leakage from pipelines, transfer and storage of methane, a gas, liquefied or not that is notoriously hard to contain.

If we are to avoid a climate catastrophe which is fast approaching we must do all we can to transition to sustainable wind, solar and wave energy as quickly as possible. Don't be taken in by corporations that will make some money in the short run and doom millions of living organisms in the medium run. We can do better than a leaking, polluting, energy guzzling liquification plant in an earthquake zone which is run on fracked gas.

1817-1 22. General Opposition

From: Paula McMinn
To: Public Comment
Subject: Sound Science Recognizing Climate Change in SEIS
Date: Wednesday, November 21, 2018 11:34:19 AM

Please use recent science and take into consideration climate change in your SEIS. Sloppy science is not what is needed and unacceptable.

Sincerely,--
Paula McMinn
Email: mmcminn18@gmail.com
Phone: 509-859-1016

1482-1 22. General Opposition

From: Mona McNeil
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:28:08 PM

Name: Mona McNeil
Email: Monarandy@monarandy.com
Address: 15704 NE 28th Couirt -
Vancouver, Washington 98686

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Puget Sound and the NW deserve clean air and clean waters. Projects like this create greenhouse gasses and pollution all along their paths, from extraction out to the ocean. Please don't let us go further down this dead end!!!

1448-1 22. General Opposition

From: David Medford
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 5:02:33 PM

Name: David Medford
Email: parkermedford@gmail.com
Address: 7020 SW 82nd Ave. -
Tigard, Oregon 97223-7316

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Puget Sound Energy is trying to build a Liquefied Natural Gas (LNG) refinery, storage and distribution facility in the Tideflats area of Tacoma. It is sited on Puyallup Tribal lands and is being built without their consent. There are many concerns about the project including taxpayer and ratepayer subsidization, safety issues, environmental impact, and the effect on our climate.
The Puget Sound Clean Air Agency (PSCAA) found the initial Environmental Impact Statement (EIS) lacking, and they opened up a Supplemental Environmental Impact Statement (SEIS) process to take into account the full life cycle impacts of natural gas (mostly fracked these days) in terms of its role in climate change. This could set an important precedent for how future projects are evaluated.
The Draft of the Supplemental Environmental Impact Statement (SEIS) was released Monday, October 8th. The draft analysis came to the conclusion that there would be less greenhouse gas produced if the project is built than if it isn't! Needless to say, their analysis is extremely flawed - let's make this point with comments to PSCAA!. Public comments will be accepted from Oct 8 until midnight on Nov 21.

1799-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:04:07 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

You're actively killing you and your citizens. Get it together.

Sincerely,

Marisha Medrano
marishaloraine@gmail.com
98104

1663-1 3. Outside of SEIS Scope
1663-2 10. LCA Calculations

From: aislinn melchior
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, October 31, 2018 10:19:33 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for allowing me to comment on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. Since fracking was introduced, it has created a series of environment problems -- from earthquakes to poisoned groundwater, to being a major contributor to the increasing concentration of greenhouse gases in our atmosphere.

I am deeply concerned about the impact of this project on air and water quality. Already we have some serious issues in Tacoma with our air quality during high pressure systems that cap the pollutants over the city. I think we need transparent reporting of our air quality and the plant is likely to contribute to smog and toxins in the Port of Tacoma.

That it is being build on alluvial land that is at the base of a fault and on the Sound that is already struggling with toxins and overfishing - a waterway already stressed to the point that we are in danger of driving the orcas extinct -- is appalling. These issues are also linked to the question of clean air because spills, earthquakes, and the like, will - we are told - dissipate into the atmosphere further eroding it.

In the draft SEIS, there are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

I am dubious about the marginal improvements in emissions the study claims for the project. We need to think short-term about our emissions because it seems we are far closer to catastrophe than the fossil fuel companies would like us to believe. The idea that we will help reduce emissions in shipping is naive because we will ultimately have to stop engaging in our current scale of trans-oceanic trade if there is to be any hope of preventing environmental collapse.

Thanks again taking on this important review of the LNG facility. I hope that you will take the best available science into consideration when revising this draft SEIS and think about the negative impacts that this project will have if it goes ahead not only on the people in the city of Tacoma and surrounding regions, but on the health and well-being of our planetary home as a whole.

aislinn melchior
amelchior@pugetsound.edu
809 N. M St.

Tacoma, Washington 98403

1716-1 10. LCA Calculations

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 21, 2018 7:51:02 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project. It is unacceptable that the people who live in the area who will be the most affected by it are not being fully and honestly informed of the risks. This should not be an LLC but a fully insured facility.

Sincerely,

Aislinn Melchior
amelchior@pugetsound.edu
98403

1599-1 22. General Opposition

From: Kristina Melnichenko
To: Public Comment
Subject: NO LNG exporting from WA
Date: Sunday, October 28, 2018 12:39:25 PM

Washington State is not here to supply the rest of the world with fracked gas when we have alternatives that do not sacrifice our climate further. Our state is not here as a profit venture for PSE. Our land, air, and water is not up for sale. If LNG is a bridge fuel, any representatives who want to spend hundreds of millions of dollars on it are not spending responsibly. Renewables and energy efficiency on the other hand have positive ROI- we need planner and politicians who recognize that.

Best regards,
Kristina Melnichenko
425-905-9038

1499-1 22. General Opposition

From: Nicole Metildi
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:17 PM

Name: Nicole Metildi
Email: nmetildi@gmail.com
Address: 3203 Nw Grant Ave -
Corvallis, Oregon 97330-2345

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We need to focus on shifting to renewable sources of energy - not continue to rely on an energy source that not only is becoming harder and harder to extract, but that continues to contribute to climate change and threaten the health and life of those around the extraction and facility locations.

1780-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 2:00:45 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Nicole Metildi
nmetildi@gmail.com
97330-2345

1352-1 22. General Opposition

From: Joan Meyerhoff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 5:13:41 PM

Name: Joan Meyerhoff
Email: joan.meyerhoff@gmail.com
Address: 4425 NE 40Th Ave -
PORTLAND, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I do not support developing the liquified natural gas that is being considered in Tacoma. Liquified natural gas is a fossil fuel. We need to channel our energy development towards renewable energy sources. Climate change is real and it's of utmost importance to our well being and the well being of future generations to do what we can do to limit it.

1847-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Robin Michelle Myers
To: Public Comment
Subject: Tidal Flats location
Date: Tuesday, November 20, 2018 1:24:08 PM

Don’t pollute our tidal flats in Tacoma as people we are voicing the responsibility we have for our surroundings. We are surely capable. Permission from the tribe is necessary it is on tribal lands. We must restore dignity and respect. Please know the pollutant rates should be scaled on the impacts within the next 20 years not 100. It recently has been released world wide that if nothing changes in the next fifteen years we cannot undo pollutants. Tidal area is very sensitive and important for nature. My life and my voice I dedicate to standing up for the voiceless and I want to see a culture shift into respecting our land. I am a student at UW Tacoma. This location is controversial because it is tribal land.

Robin Myers

1337-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Ellen Mickle
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, November 18, 2018 10:15:16 PM

Name: Ellen Mickle
Email: mickle.ellen@gmail.com
Address: 4567 NE 74th Ave -
Portland, Oregon 97218

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I'm concerned that your review of the greenhouse gas impacts of the natural gas used in this project finds a net negative in emissions if this project is built, when all research tells us that we can't build any more fossil fuel plants (if we are to stick to 2C warming).

Since methane is more destructive in the short term, and we just got word from the IPCC that we need to change our fuel mix in 12 years to avert disaster in 22, you should be using the 20-year GWP value vs. the 100. Also, your claim that BC gas is cleaner, based on industry self reporting, is a problem because they don't report on fugitive emissions from leakage, experienced by 85% of wells in Canada -- which recent atmospheric testing has shown to be a real problem in some areas of Canada, where the emissions have been found to be as much as 3.6 times what was previously thought. I'll just close by pointing out that this also doesn't make economic sense -- since the fracking boom began in 2008, the industry is $280B in debt and 29 of 33 major companies involved are in the red.

Many of the issues here are global, but I am motivated to comment on this project for a personal reason as well. I lived and worked in Tacoma for a couple years after college, in sustainable agriculture and the emergency food system. It is a special place, still home to friends of mine, and this project would be reverting back to the old ways of extractive economics (such as the ASARCO smelting plant, which 20 years later lives on via soil pollution) instead of looking to the future that the city is trying to build for itself (e.g. building up tourism). They deserve better, we all deserve better.

Thank you for your consideration. Sincerely,
Ellen Mickle

1443-1 22. General Opposition

From: Susan Miller
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:13 PM

Name: Susan Miller
Email: lelierre88@gmail.com
Address: 1 Jefferson Pkwy - Apt 302
Lake Oswego, Oregon 97035

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

My sister lives in a part of the country whose water supply has been totally contaminated by fracking. We in the Northwest want nothing to do with this poisonous process, whether that be shipping or fracking itself. We are one of the few remaining relatively unpolluted places in the U.S. and we cannot have the intrusion of toxicity for the sake of profit for anyone, including Asian markets and our own North American markets.

1553-1 3. Outside of SEIS Scope

From: Michael Miner
To: Public Comment
Subject: Common sense please
Date: Friday, November 16, 2018 1:49:44 PM

There were 230 natural gas explosions between 2010 and 2016 causing $3.4 billion in damages. More recently, Wisconsin in July, Denver in August and Massachusettes in September... you can read about natural gas explosions / fires and human incompetence for hours online. No way would this big huge LNG fiasco be worth the risk. No way.
Mike Miner, Bonney Lake

Sent from my Verizon, Samsung Galaxy Tablet

1465-2 22. General Opposition
1465-2 3. Outside of SEIS Scope

From: Elizabeth Mintz
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 1:43:20 AM

Name: Elizabeth Mintz
Email: eemintz@gmail.comSet
Address: 1550 NW 14th Ave - 436
Portland, Oregon 97209

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please stop the illegal seizure of Native Land. Enough us enough, let the natives keep their land. Stop fracking because it; 1. Polutes our air 2. Contaminates ground water 3. Poisons animals, plants and people 4. Can explode and harm communities and workers alike. 5. Increases climate change and is a bad idea over all. Say no to the project please. God Bless. Stop Mother Earth from being raped. Thanks.

1884-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

I am concerned about errors in this analysis that downplay the risks that contribute to global warming

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: NANCY MOGIELNICKI Email: mogsaway@yahoo.com

Address: 3741 NE 35th AVE PORTLAND, OR 97212

By completing this comment card you agree to receive updates about the project.

1886-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to ~~deny the permit~~ because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

I am concerned that the analysis of methane leakage is under valued. Leaks are a major issue and contribute significantly to global warming

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: NANCY MOGIELNICKI Email: Mogsaway@yahoo.com

Address: 3741 NE 35th AVE PORTLAND OR 97212

By completing this comment card you agree to receive updates about the project.

1885-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

It seems that every week there is new research that worsens our position re climate change. WE ARE IN CRISIS and thinking That a "bridge fuel" is helpful is lunacy. We are well past that point.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: PETER MOGIELNICKI Email: mogsaway@yahoo.com
Address: 3741 NE 35TH AVE Portland, OR 97212

By completing this comment card you agree to receive updates about the project.

1544-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Jason Monk
To: Public Comment
Subject: Comment on Puget sound energy LNG project
Date: Tuesday, November 20, 2018 9:01:53 PM

Hello to whom it may concern at pscaa,
I am writing to voice my concern about and opposition to the LNG project proposed at tidewater flats in the Puget Sound region.

My concern is that the supplemental environmental impact statement does inadequately address the true value of green house gas warming potential of methane. The report from pse uses outdated data from 2007, based on a 100 year projected impact. It's important that the report accurately represent the true warming potential of methane based on up to date science from 2016, dealing with a 20 year time frame. The truth of our situation is that the most radical changes in our energy sector need to occur within the next 20 years in order to address climate change ASAP. Using these up to date numbers, the plant becomes %150 dirtier by it's gwp than previously reported.

Thanks for the work you do and for reading my comment. It is of concern to me that these energy projects are still being proposed on the west coast, when we should be focusing our resources into development of Renewable energy infrastructure.
Jason Monk

From: Dale Monroe <Dale.Monroe@wrsweb.com>
Sent: Thursday, November 1, 2018 6:52 PM
To: Public Comment
Subject: Support LNG

Dale Monroe
360-815-2316

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility at the Port of Tacoma. This letter reflects my comments in support of the Puget Sound Clean Air Agency (PSCAA) finalizing its SEIS consistent with the draft it issued on October 8, 2018 and timely issuing PSE the necessary permit(s) to proceed.

There are many stakeholders in the effort to reduce emissions, and even more moving parts to the actual process of doing so. In the last five years alone, the Port of Tacoma, the Port of Seattle and the Vancouver Fraser [Canada] Port Authority have created an updated Northwest Ports Clean Air Strategy with the objectives of reducing port-related air quality impacts of diesel particulate matter, reducing greenhouse gas emissions, and helping meet air quality standards and objectives for the airshed. The PSCAA itself is a partner in the implementation of this effort, along with agencies including the Environmental Protection Agency (EPA).

The PSE LNG facility is one part of the task of reducing diesel emissions. LNG fuel cuts particulate matter (PM) emissions produced by ships by more than 85%. These particulates are extremely harmful to the lung health of dock workers and those in the surrounding neighborhoods. According to dock workers, they not only see the black diesel particulates floating in the air, but they breathe them in as well while ships (still burning diesel) are waiting to dock. Besides eliminating the PM emissions, LNG fuel also reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% and nitrogen oxide (NOx) emissions by nearly 85%. Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

Reducing these real-time emissions is a matter of social justice. Port workers should not be subjected to this polluted air just for doing their jobs. Workers all across the West Coast ports have been vocal about the need to reduce these emissions in their work place, and they have played an integral role in supporting ports' efforts such as the Northwest Ports Clean Air Strategy to reduce emissions. Locating the Tacoma LNG facility within the Port of Tacoma advances the effort to reduce emissions at their source.

Beyond emissions affecting ports and immediately adjacent neighborhoods, the United States has staked out the position that vessels must control emissions when travelling America's coastlines up and down the Pacific Ocean. Annex 6 to the MARPOL Treaty, for which the EPA is the enforcing agency, requires Jones Act-flagged ships that travel near to shore to significantly reduce their emissions by using cleaner fuels. TOTE's use of fuel from Tacoma LNG to power its fast-transit, near-shore ships allows the company to substantially exceed its regulatory commitment to the EPA. By using

LNG, TOTE will provide major emissions reductions benefitting public health for all communities and residents along its West Coast route, which transits nearly all of Puget Sound and ends in Anchorage, Alaska.

The Tacoma LNG facility is a project that allows multiple stakeholders – coastal communities, the Port of Tacoma, adjacent neighborhoods, PSCAA, EPA and TOTE - to affirmatively advance their interests in emissions reductions. Speaking for the dock and port workers, both our health and economic well-being are furthered by wrapping up this project's environmental review and permit effort promptly without undue delay. Please, let's keep those good, family wage jobs at the Port of Tacoma and make the air the workers breathe healthier.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Taking into consideration the overall reduction in greenhouse gas emissions confirmed by the draft SEIS for Tacoma LNG, and the human and environmental benefits of such reductions, I fully support PSCAA finalizing its SEPA review and granting the necessary permit(s) so this important addition to our region can be completed within its new scheduled timeframe.

[05:40:25] So, Joanna Monroe?

Joanna: I think it's important to remember that there is a lot more that we have in common than what divides us. I think all of us can agree we want to see living wage jobs, affordable housing, great schools, and, of course, a clean environment. The use of LNG moves us toward that shared vision by reducing greenhouse gases, while keeping our port competitive.

[05:41:00] And, if there was ever a time to look at the facts and to look at the science, it's now. I'm Joanna Monroe. I'm a business woman. I'm an attorney. And I've raised my family in this community for two decades. I support the construction of an LNG facility at the Port of Tacoma. And, at this point, in the process, with all that's been done, it is an easy endorsement. As you know, the environmental impact statement was evaluated by numerous agencies.

The Department of Transportation, the Army Corps of Engineers, the Coast Guard, the National Marine and Fisheries Service, the Port of Tacoma, Department of Fish and Wildlife, Department of Archeology and Historic Preservation, the city of Tacoma, Pierce County, and the city of Fife. All of these folks have had a chance to weigh in and evaluate this. And there are three things that I take away from it. 1) That LNG is safe. 2) That it will be a much cleaner fuel than diesel. And 3) that it exceeds all federal, state, and local requirements.

[05:42:00] The objective data, the science in front of you, unequivocally shows that moving to LNG would have a positive benefit on this community. And I implore the Air Agency to stick to the facts because to delay the environmental benefits of this project is simply unconscionable. No matter how loud the protest, at some point, we have to rely on the facts in front of us, the things that have been verified, and not rely on wildly distorted gossip or piece together studies that are not supported by the evidence. We have to listen to the scientists over the shouting of activists.

Steve: Please let the speaker speak.

Joanna: I have nothing further. Thank you.

1963-1 23. General Support

From: Joanna Monroe
To: Public Comment
Cc: Ryan Thompson; Tim Thompson
Subject: Letter in support of LNG and Tote
Date: Wednesday, November 21, 2018 1:17:26 PM
Attachments: image002.png
Letter in support of LNG and Tote.pdf

To whom it may concern,

Attached please find my letter in support of the approval of the LNG project.

Best,

Joanna

Joanna Monroe
253-208-2054
www.consultjsm.com

JOANNA S. MONROE
Fircrest, WA 98466 • (253) 208-2054 • Joannasmonroe@outlook.com • Joanna Monroe (Sennett)

November 21, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

Re: Support of LNG and Tote Maritime

Regardless of our differences, all in our community want living wage jobs, affordable housing, great schools, and a clean environment. The use of LNG moves us toward that shared vision by reducing greenhouse gasses while keeping our port competitive.

As a business woman, an attorney and a mother who has raised my family in this community for the last 2 decades, I support the construction of an LNG facility at the Port of Tacoma.

The Final Environmental Impact Statement - which was evaluated by numerous agencies - including the DOT, Army Corps of Engineers, Coast Guard, National Marine Fisheries Service, Port of Tacoma, Department of Fish and Wildlife, Department of Archaeology and Historic Preservation, Department of Ecology, City of Tacoma, Pierce County and the City of Fife - concluded that:

- LNG was safe
- It will be a much cleaner fuel than diesel
- And that it exceeds all federal, state and local air quality requirements

The objective data, analysis and science unequivocally shows that moving to LNG would have a positive benefit on the environment and failing to convert would negatively impact the environment.

I implore the Air Agency on this critically-important project, to stick to the facts because to delay the environmental benefits of this project is unconscionable. No matter how loud the protest, at some point we have to rely on what we know and verified by statistically valid analysis and testing, not wildly-distorted gossip and pieced-together “studies” from activists shouting over scientists.

Thank you

Joanna Monroe

1729-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 9:39:38 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

No LNG Comment Countdown Day 6: Speak out - fracked gas makes us and the planet sick!

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Anita Montgomery
montgomery.anita@comcast.net
98512-8515

1583-1 3. Outside of SEIS Scope
1583-2 5. Regulatory Framework

From: melanie moor
To: Public Comment
Subject: LNG proposed project
Date: Wednesday, October 31, 2018 6:12:38 PM

There are so many reasons the Tacoma Tide flats should not be where the LNG facility is built and LNG stored.

The one that concerns me the most is that it's on an earthquake fault and thousands of people live in the "blast zone."
The other reason I oppose the project is that the Puyallup Tribe hasn't given permission to build on their tribal land.

thank you,

Melanie Moor
1506 N. 8th St
Tacoma 98043

Carole: Thank you. Bliss Moore?

Bliss: First, thanks to Puget Sound Clean Air Agency for having this hearing. This is an extremely vital hearing. I'm a resident of Tacoma for the last 31 years. I lived out on a clean up site called the Asarco. It's transformed. It was a terrible place. Anyway, getting on, I think this, clearly, this SEIS is totally unacceptable for all of the reasons that have been brought up by many others this evening.

[01:33:09] I would like to mention I want to thank Debbie Cochran of the TNT for this article a few days ago that outlines the issues of this SEIS. And I think it was very useful. I urge people to read it, if they want to know more about it. I'm not going to go into a lot of detail of what's been said tonight. I'm an active member of the Sierra Club. I'm, currently, the vice chair of the local group for Pierce County. We've worked closely with the Puyallup Tribe.

[01:34:00] And I'm also encouraged opposing this for a whole host of reasons that have been brought up tonight. I'm very pleased to hear that the Citizens for a Healthy Bay has taken a position against this. It's a very well respected environmental agency, local environmental agency, of this whole Commencement Bay area. And I'll just say the issues of methane leakage is a huge one because it's 85 or 86, 87 times worse as a greenhouse gas. There are safety hazards at the plant, too. Look at the state of California. They have banned any LNG facilities there like we're going to have as proposed here.

[01:35:07] Why did they do that? For safety reasons. They had serious issues of fires and such. Anyway, that's about all I really have to say. But this is totally unacceptable. We've got to go back to the drawing boards and get good data. The data that was used, as pointed out in the TNT article, clearly shows that this needs to be done. Thank you.

Carole: Thank you. Darren Moore?

[01:45:00]

Darren: Hello, again. Thank you, guys, for having this hearing. We have to stop meeting like this. I want to take the time to recognize that we're on the ancestral lands of the Puyallup Tribe, and we're discussing a project that sits directly on Medicine Creek tree land. My name is Darren Moore. I am a Tacoma resident. I'm a homeowner in Tacoma. I am deeply concerned at the risk this project represents to my family and my friends. My wife grew up here in Tacoma. As a family, we moved here as part of a program to relocate Native people away from their reservations.

She is an enrolled of the Standing Rock Sioux Tribe in North Dakota. Together, we are the co-founders of Native Daily Network and have been very active in covering the local and tribal opposition to this facility. Today, some people more eloquent and better educated than I will explain to you the folly of the SEIS that was published on October 8. They will explain why it's not really supplemental to the original EIS and that it is based on a lot of guess work and some very narrowly defined and unrealistic outcomes. For me, due to my family, my community, and my work, I am particularly concerned for my tribal relatives.

[01:46:04] There is a narrative in American life regarding liberty and freedom. The Native people of the Americas were free before genocide, an American holocaust. It wiped out tens of millions. Genocide was further perpetuated through the removal of land and eradication of the First People's way of life. The latter portion was done via treaties, which left most Native people with just a small fraction of their original homelands. Even after the treaties, settlers continued to commit a slow but steady genocide on the Native populations by building on their land or impacting their treaty rights to the point that they were no longer able to practice them.

Those who have done this have gotten away with it because they have been enabled by agency after agency. And they have been complicit in that genocide. The Puyallup Tribe, the Salmon People, have a treaty right to fish. They site where the LNG facility sits is directly outside of their reservation boundaries but firmly within their protected treaty territory. They have never seeded their fishing rights.

[01:47:00] The board decision, which was upheld by the US Supreme Court in

’75, reaffirmed their fishing rights in usual and accustomed places. The tide flats, their estuary, was such a place where the salmon spawned, and they collected crustaceans. The city and the port have contended that the tribe gave up title and rights to this area under a 1990 land claim settlement. But as this site is off reservation, they could never have given up title to it. The city and port have been lying to everyone and have been getting away with it due to enabling agencies. Let’s put a stop to that today.

The treaties come with a federal trust responsibility, which Annette alluded to earlier meaning that any change that may impact the treaties must come with a government to government negotiation. If the tribe says no, then, it doesn’t happen. No, it happens, really does mean no. I understand that the responsibility to decide on this permit has been delegated to you. But with that, you have also inherited the federal trust responsibility. You must negotiate with the tribe. To ignore that would be to enable the further eradication of the Native people and would be tantamount to continuing genocide and holocaust.

[01:48:04] As the First People lose their ability to practice their culture, eventually, they will cease to exist. I leave you with a rhetorical question. If and/or when you make a decision that negatively impacts the tribe, when you go home to your families, celebrate Thanksgiving, or when you look at your children, will you be honest enough to tell them that, at work, you helped to commit genocide and that you actively and willingly participated in their holocaust? I have a feeling history will, eventually, tell the truth. Where will your name be? What legacy will you leave?

1994-1 23. General Support

From: Rick Moore
To: Public Comment
Subject: Public Comment for Proposed Tacoma LNG Draft Supplemental EIS
Date: Monday, November 19, 2018 11:04:52 AM
Attachments: MooreCommentLetterPSELNGDSEIS_11192018.pdf

Hi -

Please see my attached comments for the DSEIS.

Thanks

--

Rick Moore
(206) 733-0841
1133 NW 200th Street
Shoreline, Washington 98177

November 19, 2018

Puget Sound Clean Air Agency (PSCAA)
1904 Third Avenue, Suite 105
Seattle, Washington 98101

Public Comment for Draft Supplemental Environmental Impact Statement (DSEIS), Puget Sound Energy (PSE) Liquefied Natural Gas (LNG) Project, Tacoma, Washington

I have read the DSEIS evaluating greenhouse gas (GHG) emissions for the PSE LNG project and urge PSCAA to approve the Proposed Action for construction and operation of the facility. The SEIS presents a balanced and comprehensive study of life cycle GHG emissions and concludes that that the project would significantly reduce emissions by replacing diesel and marine fuels with cleaner-burning LNG. This reduction of GHGs by up to 57,000 tonnes per year represents a tremendous environmental benefit for the Puget Sound region and beyond. The more that LNG can replace diesel and marine fuels, the greater the benefit to the environment.

As an environmental professional in the Puget Sound area for 30 years, I have had the privilege of working on many environmental projects at the Port of Tacoma. These projects not only improve the health of our environment, but also help sustain and preserve public and commercial infrastructure vital to our community. In this same way, the LNG project directly serves maritime transport services by providing cleaner-burning LNG as a fuel source. The project also provides a reliable source of natural gas for peak shaving to enhance the resiliency of the gas distribution system during periods of high demand. As a result, the LNG project is estimated to achieve annual social benefits of $5.7 million from these end uses.

The LNG project offers a viable and sustainable opportunity for substantial environmental and socioeconomic benefits that support the continued prosperity of the region. The No Action Alternative cannot achieve these same benefits, and to the contrary, would result in higher levels of GHG emissions that would continue to degrade air quality. The Proposed Action should be approved promptly to facilitate permitting and construction of the LNG facility so that the benefits of the project can be realized.

Sincerely,

Richard J. Moore

Richard Moore
1133 NW 200th Street
Shoreline, Washington 98177

0460-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I grew up in South Pierce County where the Sulphur Smell of the pulp mills at the port of TACOMA would fill the air and leave a yellowish haze over South Puget Sound.

The air was acrid, ugly and toxic.

I know that no one desires a return to those smoggy, suffocating days.

Please include this in the final supplemental environmental impact statement.

Name: M. Morford	Phone: 253-777-9420
Address: 3716 N. Madison	Email: MMorfe@MAIL.COM

Please do what is best, not just for us, but for the next Generation.

0461-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

Growing up in TACOMA, I heard defenders of ASARCO And the pulp mills describe the Sulphonic stench As 'The Smell of Money'.

it was indeed the 'smell of Money' - it was the smell of decaying property values, A reputation of A city of toxic residue And waste.

We have the term 'ANOMIA of TACOMA' which will Linger for generations. We cannot Afford more of this!

Please include this in the final supplemental environmental impact statement.

Name: Mort Manford	Phone: 253-777-9420
Address: 3716 N. Madison	Email: MMORT@MAIL.COM

0473-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a resident of the north End of Tacoma, I am a Tacoma native and have lived with the ill effects of the Arsarco Smelter all my life. I remember being pregnant and eating lettuce out of my garden in Old Town. Two weeks after picking and eating greens I read a small article in the paper telling the community that their had been a burn out at Asarco releasing arsenic + lead which would concentrate in the green plants of gardens + They should not be eaten. It was too late, I had already done that. I have lived with not trusting the soil on my property & the air.

Please include this in the final supplemental environmental impact statement.

I feel that we should not have to live with the threat of air pollution or fire or explosion.

Name: Marion Morford	Phone: (253) 759-4352
Address: 3716 North Madison	Email: marionruthmorford@gmail.com

Clean air is a basic human right. Please re-do the SEIS using current models and consider whether an LNG plant is really the right, cleaner option for the tideflats of Tacoma

0474-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a Tacoma native and have grown up near the Asarco Smelter. I have lived with an the threat of increased risk of cancer, etc. My father had a rare form of bladder cancer associated with living near Asarco. I have had to come to grips with living in a place that is as polluted as Love Canal. Tacoma needs a clean environment future. We cannot accept any more assaults to our environment. Please enforce the highest standards for our community.

Please include this in the final supplemental environmental impact statement.

Name: M. Morford	**Phone:** (253) 759-4352
Address: 3716 North Madison	**Email:** marionruthmorford@gmail.com

1588-1 3. Outside of SEIS Scope
1588-2 5. Regulatory Framework

From: Libbie morgana
To: Public Comment
Subject: LNG SEIS public comment
Date: Saturday, October 27, 2018 8:07:31 AM

How is an 8 million gallon fracked gas facility allowed to be built in such a populated area? There are hospitals,several schools,hundreds of businesses,and an ICE facility with prisoners who have no way out if something happens.I recommend that the SEIS covers the health and safety effects on the NW Detention Center prisoners.I also recommend that the Puyallup Tribe br fully included in this process.They were completely left out of the loop.After all,it is on their land and the Medicine Creek treaty and Boldt decision make that clear.--signed Glencairn Murray

2541-1 22. General Opposition
2541-2 3. Outside of SEIS Scope
2541-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2541-4 7. SEPA Alternatives
2541-5 7. SEPA Alternatives

From: d.morin@everyactioncustom.com on behalf of Donna Morin
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 12:43:14 PM

Dear Responsible Official,

Please help stop the proposed 14-story tall fracked gas tank at the Port of Tacoma! As a major project of Puget Sound Energy and Tote Marine, it would contribute significant amounts of air and water pollution to the Pacific NW. As you know, using gas and petroleum products contributes to climate chaos: the IPCC has given us a clear warning that we must urgently move away from fossil fuels, so, help stop a fracking tower.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you. Please consider these actions:

1. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

2. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

3. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked Liquid Natural Gas.

This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments. Our children
deserve to inherit a planet worth living on.

Sincerely,
Donna Morin
Mountlake Terrace, WA 98043
d.morin@comcast.net

1651-1 5. Regulatory Framework
1651-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1651-3 3. Outside of SEIS Scope

From: Sarah Morken
To: Public Comment
Subject: Puget Sound Energy - LNG Facility Tacoma, Draft Supplemental Environmental Impact Statement
Date: Wednesday, October 31, 2018 3:33:57 PM

To whom it may concern,

The PSE LNG project has violated the terms of the Medicine Creek Treaty.

Fracked gas from BC is not cleaner and does not have lower rate of methane leaks. We should not take self reports from the natural gas industry as reliable evidence.

We should not be allowing more fossil fuel infrastructure to be built. This project relies on fracked gas. Fracking pollutes the air, water and soil. This project would locking us into more polluting, climate change causing, antiquated technology.

This is irresponsible.

Our beautiful deepwater port could be promoted as a whale sanctuary, which would promote clean air, science, education, tourism, etc.

No LNG. Sustainable future for the kids.

Sarah Morken
5004 88th Street Ct SW, Apt Q204
Lakewood, WA 98499
253-973-8153

0305-1 22. General Opposition

LNG is bad for the environment, Tacoma, The Puyallup Tribe and our Planet.

NOT LOCAL
NOT SAFE
NO CLEAN
NO!

(over)

SEATTLE WA 980
15 OCT 2018 PM 3 L

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
OCT 16 2018
Puget Sound
Clean Air Agency

I am a Washington resident who is strongly opposed to the development of LNG in our state.

I am dismayed to discover that our money is being funneled in this direction instead of renewables.

Please hear us and our opposition to this. Thank you

0281-1 22. General Opposition

REX MORRIS
PO BOX 495
98070

SEATTLE WA 980

15 OCT 2018 PM 7 L

RECEIVED
OCT 17 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG
1904 Third Ave, Suite 105
Seattle, WA 98101

The FRACKING, transportation and use of LNG DOES NOT make air cleaner. Please make responsible choices in TACOMA and respect the lands of the Puyallup's peoples. Turn down the heat on global warming and start right here in the PACIFIC NORTHWEST!

Rex Morris

98101-331730

LOCAL RESIDENT HUMAN



RECEIVED
NOV 2 1 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740



Ms. Carole Galloway
5216 64th St W
University Pl, WA 98467-3702

0357-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Amy Morrison

Address or email amy@backbonecampaign.org
Vashon Island WA

My organization, the Backbone Campaign, supports the testimony of the Puyallup Tribe.

It is fiscally & morally irresponsible to build new fossil fuel infrastructure at this time in Washington State.

PSE is the biggest polluter in WA State. This will make our air dirtier. We cannot afford this facility.

1725-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 8:55:35 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency's analysis is based on 100-year, not 20-year, global warming potential (GWP) values. Given the IPCC report that was released last month indicating that we have 12 years to avoid climate catastrophe, the Clean Air Agency should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the "dirty fuel" it's supposed to replace.

Sincerely,

Dana Morrison
dougadoresdana@gmail.com
98405

RECEIVED
NOV 7 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the

Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
2. You must accept the historic treaty rights of the Puyallup Tribe.
3. I stand with the Puyallups in opposing this LNG facility for many reasons, some of which I present here:
   a) Climate impacts of leaked gas are 87 times worse than CO2 at warming the environment over a 20-year period of time. Leakage rates of 3% are very conservative estimates; consider the BC gas pipeline explosion a few weeks ago, which released natural gas into the environment.
   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
4. This draft SEIS is incomplete in more than 10 locations in this report, where there is incomplete information, or where it is stated that there is more information needed from Puget Sound Energy Corporation. This incompleteness makes your draft report analysis unacceptable.

Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740

→ 2405 No. Stevens St Tacoma WA 98406

0666-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0666-2 21. LCA Inputs and Assumptions - Additional Air Pollutants
0666-3 3. Outside of SEIS Scope
0666-4 10. LCA Calculations

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

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Respectfully,

Ron Morrison , Tacoma WA

Billie Blattler , Steilacoom WA

Carole Galloway, Tacoma WA

Ron Morrison
Billie Blattler
Carole Galloway
Puyallup Tribe Mbr #740

0727-1 22. General Opposition
0727-2 5. Regulatory Framework
0727-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
0727-4 14. LCA Inputs and Assumptions - Leakage/Slippage
0727-5 21. LCA Inputs and Assumptions - Additional Air Pollutants
0727-6 3. Outside of SEIS Scope
0727-7 10. LCA Calculations

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

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   b) The emissions of ammonia, arsenic, cadmium, hydrogen sulfide, sulphur dioxide, and flared VOCs may include chemicals linked to birth defects, cause cancer, and damage the nervous system of humans.
   c) This facility will be subject to rising sea levels, lahars, earthquakes, and tsunamis, and in any of these incidents, is at great risk of spilling its contents of LNG.
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Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Puyallup Tribe Elder #740

RECEIVED
NOV 2 1 2018
Puget Sound
Clean Air Agency

November 1st, 2018

"Open letter to Puget Sound Clean Air Agency, regarding your draft report on the Tacoma LNG facility"

1. You need to go back and start over, using the best available CURRENT SCIENCE. Your draft does not account for the FULL climate impacts of fracked gas, as it is unacceptably flawed.
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Respectfully,

Ron Morrision , Tacoma WA

Billie Blattler , Steilacoom WA

Carol Galloway, Tacoma WA

Carole Galloway
Puyallup Tribe Mbr #740



Ms. Carole Galloway
5216 64th St W
University Pl, WA 98467-3702

1849-1 22. General Opposition

Mahoney, Melisa

From: Deborah Mosher <debwelsh3@gmail.com>
Sent: Wednesday, November 21, 2018 12:15 PM
To: Public Comment

I am a resident of Suquamish and I as well would like Washington to hear all of our voices of Concern to Halt indefinitely LNG. I moved to the beautiful PNW three years ago because of its Beauty and how very vocal the State's Environmentalist are. We have to stand strong and do the right thing for our future generations. Please hear our voices..young and old.
There has to be something said about a gathering of concerned citizens c coming together for the common good.Why does money Always come before Humanity?

1697-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 11:13:17 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Deborah Mosher
debwelsh3@gmail.com
98392

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 12:59:09 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. First honor the Treaties, and reject the Clean Air Permit for this dirty project! Second, with ten years to mitigate climate change, we cannot be using gas, oil or coal. Reject this permit so that we can convert to solar, wind, water and geothermal power.

Sincerely,

Nancy Mueller
nancymomma@gmail.com
53211

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the impact on fracked gas on water. The SEIS must consider the high potential of contamination from chemicals, radioactivity, and other toxins released by methanol associated with fracked gas. Please study the impact of fracked gas on our water.

thank you.

Guila Muir

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S.	Phone: 206 725 1994
S. 110, WA 98144	

0566-1 3. Outside of SEIS Scope

0590-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

overall
Study the impact of Tacoma LNG + Kalama - (not other projects).

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S. Seattle WA 98144	Phone: 206 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about methane leaks all along the supply chain. Methane leads to unhealthy communities, birth defects, and even early death according to Physicians for Social Responsibility. Please study the upstream impacts.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: GUILA MULL	Email: guilaeguilamuir.com
Address: 3724 38th Ave S	Phone: 206 725 1994

0592-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

The Kalama methanol refinery would take 5 MILLION gallons of water per day out of the Columbia River. That's crazy!! Water is life. The releases + spills would also contaminate the river. Please study the impact of methane on our waterways.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: GUILA MUIR	Email: guila@guilamuir.com
Address: 3724 38th Ave S	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I'm worried sick about the increased tankers (as many as 6 per month) added to current Columbia River traffic. Accidents and leakages are a PROBABILITY, not a possibility. That means extreme pollution in our waterways.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muse	Email: gu.lamguilamuir.com
Address: 3724 38th Ave S	Phone: 206) 725 1994

0594-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Building the biggest methanol refinery in the world in an earthquake zone?! That's an incredibly thoughtless and STUPID idea for all living things in this area.

Please study this issue!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S	Phone: (206) 725 1994

0595-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Salmon + Orca are already fighting extinction. ~~T~~Toxic and dangerous methanol would endanger their lives even further.

Please study these impacts!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S. Seattle	Phone: 206 725 1994

0627-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

LNG is Not a "bridge fuel". The profit-making companies would create more and more of it to export to China for plastic making... it's permanent, not a "bridge."

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guilae guilamuir.com
Address: 3724 38th Ave S.	Phone: 206 725 1994
Seattle WA 98144	

0628-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

As a greenhouse gas, methane is 86 X more powerful than carbon dioxide (over the course of 20 yrs).

Please consider lifecycle emissions.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S	Phone: 206 725 1994
Seattle, WA 98144	

0629-1 7. SEPA Alternatives

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Both SEIS documents must focus on the added environmental impacts of the proposals at hand without assuming they will displace other proposals.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guilaine	Email: guilaine@guilainemuir.com
Address: 3724 38th Ave S Seattle, WA 98144	Phone: (206) 725 1994

0630-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

As an open water swimmer and lover of water, I am totally afraid of what the ~~Fuel~~ Kalama plant would do to ALL water in the region (and ultimately, around the world).
Leaks would kill marine mammals, fish, and maybe even me.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Camila Muñoz	Email: guiha@guilamuñoz.com
Address: 3724 38th Ave S Seattle WA 98144	Phone: (209) 725-1494

0661-2 14. LCA Inputs and Assumptions - Leakage/Slippage
0661-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

RECEIVED
NOV 6 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Gaila Muir

Address or email 3724 38th Ave S, Seattle, WA 98144

I am extremely concerned the "fugitive emissions" and marine emissions the Tacoma LNG facility will produce, if allowed to proceed with its building (without essential permits). Fugitive emissions have proven to be much higher than estimated - above 10% in some areas. Since methane is much more toxic than CO^2 in its 1st 20 years, this is extremely alarming.

LNG tankers will release marine emissions, a threat to marine wildlife and to humans' hearts and lungs.

As an open-water swimmer and older adult, I see the LNG facility as both →

a personal and a community risk.
Please deny the final permits for this LNG
tremendous mistake.

Thank you —

Gaila Muir
206 725 1994

1543-1 3. Outside of SEIS Scope
1543-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Guila Muir and Associates
To: Public Comment
Subject: Comment on PSE LNG Project
Date: Sunday, November 4, 2018 2:25:51 PM

I am writing to express my deep fear about the PSE LNG Project. The final permit(s) MUST be denied, and this dangerous project stopped immediately. I am a "regular citizen" who has studied this issue and who cares about the health and safety of our citizens, communities, and region.

The LNG facility is a direct threat to life for living things on land and in the water in our region. PSE's LNG facility is located on the Cascadian fault, in a zone at risk for earthquakes and tsunamis, in an area that the City of Tacoma predicts will be flooded by 2050. If the tank were to explode, the blast zone would decimate everything within three miles. A leak into Puget Sound of the coolant necessary to run the plant would literally freeze sea life.

We must also consider the pipelines that carry methane gas to the PSE LNG Project. Methane gas escapes during extraction and transportation. Methane gas is three times more potent in producing the greenhouse effect than the diesel gas currently used for shipping. "Fugitive" and marine leaks and emissions are inevitable, and currently occurring with existing pipelines. Methane is 86 times worse than carbon dioxide as a greenhouse gas over a 20-year period. That is terrible news for air quality and safety.

The Puget Sound Clean Air Agency MUST deny any further permits, and put an immediate halt to this for-profit, Australian-owned project.

Thank you.

Sincerely, Guila Muir
3724 38th Ave S
Seattle, WA 98144
206 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2048-1 3. Outside of SEIS Scope

I am concerned about the impact on fracked gas on water. The SEIS must consider the high potential of contamination from chemicals, radioactivity, and other toxins released by methanol associated with fracked gas. Please study the impact of fracked gas on our water.

thank you.

Guila Muir

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S. Seattle, WA 98144	Phone: 206 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2121-1 3. Outside of SEIS Scope

Salmon + Orca are already fighting extinction. Toxic and dangerous methanol would endanger their lives even further.

Please study these impacts!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S. Seattle, WA 98144	Phone: 206 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2122-1 3. Outside of SEIS Scope

Buildive the biggest methanol refinery in the world in an earthquake zone?! That's an incredibly thoughtless and STUPID idea for all living things in this area.

Please study this issue!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S	Phone: (206) 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2123-1 3. Outside of SEIS Scope

I'm worried sick about the increased tankers (as many as 6 per month) added to current Columbia River traffic. Accidents and leakages are a PROBABILITY, not a possibility. That means extreme pollution in our waterways.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S Seattle, WA 98144	Phone: (206) 725 1994

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2124-1 3. Outside of SEIS Scope

The Kalama Methanol refinery would take 5 MILLION gallons of water per day out of the Columbia River. That's crazy!! Water is life. The releases + spills would also contaminate the river. Please study the impact of methane on our waterways.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: QUILA MUIR	Email: quila@quilamuir.com
Address: 3724 38th Ave S Seattle, WA 98	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2125-1 3. Outside of SEIS Scope

I am concerned about methane leaks all along the supply chain. Methane leads to unhealthy communities, birth defects, and even early death according to Physicians for Social Responsibility. Please study the upstream impacts.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: GUILA MUIR	Email: guilaguilamuir.com
Address: 3724 38th Ave S	Phone: 206 725 1994

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2126-1 3. Outside of SEIS Scope

overall
Study the impact of Tacoma LNG + Kalama - (not other projects).

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S. Seattle WA 98144	Phone: 206 725 1994

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2156

2156-1 3. Outside of SEIS Scope

As an open water swimmer and lover of water, I am totally afraid of what the ~~[redacted]~~ Kalama plant would do to ALL water in the region (and ultimately, around the world). Leaks would kill marine mammals, fish, and maybe even me.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 36th Ave S	Phone: (209) 725-1494
Seattle WA 98144	

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2157-1 22. General Opposition

Both SEIS documents must focus on the added environmental impacts of the proposals at hand without assuming they will displace other proposals.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guilaine Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S Seattle WA 98144	Phone: (206) 725 1944

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2158-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

As a greenhouse gas, methane is 86 x more powerful than carbon dioxide (over the course of 20 yrs).

Please consider lifecycle emissions.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guila Muir	Email: guila@guilamuir.com
Address: 3724 38th Ave S	Phone: 206 725 1994
Seattle, WA 98144	

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2159-1 22. General Opposition

LNG is Not a "bridge" fuel. The profit-making companies would create more and more of it to export to China for plastic making... it's permanent, not a "bridge."

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Guilia Muir	Email: guilia@guilamuir.com
Address: 3724 38th Ave S. Seattle, WA 98144	Phone: 206 725 1994

1330-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1330-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: K&W
To: Public Comment
Subject: ATTN: Public comment, PSE LNG Project (DSEIS)
Date: Wednesday, November 21, 2018 3:50:43 PM

Dear Puget Sound Clean Air Agency,

I am writing regarding the Puget Sound Energy LNG gas project that is proposed (and currently being built, unpermitted!) in Tacoma. Thank you for undertaking this review process; as the recently-released IPCC report indicates, it is critical that we fully understand the greenhouse gas implications of any proposed energy infrastructure projects, and that we must act boldly to block fossil fuel projects that will further imperil our climate.

There are innumerable issues with the draft SEIS as written. Perhaps most importantly, the SEIS does not use the appropriate Global Warming Potential (GWP) values for methane. The report relies on the 100-year values listed in the 2007 IPCC report (25), whereas the 2013 IPCC report updated this value to 28, and a more recent scientific paper (also by the IPCC authors), concludes the value is actually 32. Using the updated GWP figures would dramatically change the conclusions reached in the SEIS.

Furthermore, it is actually inappropriate to be using 100 year values at all. Given the urgency of the climate crisis (the IPCC report, typically a fairly conservative assessment, concludes that we have little over a decade to get our greenhouse gases to dramatically reduce our greenhouse gas emissions), it is not reasonable to be using 100-year GWP values at all. Methane is a far more potent greenhouse gas over a shorter time frame. Using the out-dated IPCC report, the 20-year GWP of methane is 72, and the value is 86 in the 2013 IPCC report. Obviously, using these more appropriate values would completely change the conclusions reached in the SEIS.

I respectfully request that the SEIS be revised to reflect the best available science and that a new comment period be opened following this revision.

Sincerely,

Dr. Katherine Muller

1333-1 13. LCA Inputs and Assumptions - Natural Gas Source
1333-2 19. LCA Inputs and Assumptions - End Use
1333-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: K&W
To: Public Comment
Subject: ATTN: Public comment on PSE LNG Project (DSEIS)
Date: Wednesday, November 21, 2018 3:45:13 PM

Dear Puget Sound Clean Air Agency,

I am writing to you regarding the Puget Sound Energy LNG gas project proposed for construction in Tacoma. I thank you for undertaking this review process; as the recently-released IPCC report indicates, it is critical that we fully understand the greenhouse gas implications of any proposed energy infrastructure projects, and that we must act boldly to block fossil fuel projects that will further imperil our climate.

The current draft SEIS is incomplete and relies on faulty assumptions. One of the assumptions is that Puget LNG will receive greenhouse gas reduction credits for additional maritime customers who don't yet exist. That's a little bit like my going to buy a car and saying "I'd like to take the car now and I'll pay for it later because I think I can probably get a job in the future. Do you think that the car salesman would let me leave the lot with a new car on the basis of an expectation that I could pay for it with my hypothetical new job? I don't think so.

The SEIS also assumes that the gas would come from British Columbia and that fracked gas from BC has much lower leakage rates than gas sourced from other areas. Most estimates of leakage come from the fossil fuel companies themselves and recent analyses from 2017 and 2018 indicate that most fracked gas wells are significantly under-reporting their methane leakage numbers. Thus, the BC leakage values used are not the most current or most accurate values. Furthermore, even if BC did have substantially lower methane leakage rates, there is no way to guarantee (or require) that the project utilize fracked gas from a specific source.

I respectfully request that the SEIS be revised to utilize more realistic assumptions and that a new comment period be opened following this revision.

Sincerely,

Dr. Katherine Muller

1360-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: K&W
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 3:47:55 PM

Dear Puget Sound Clean Air Agency,

I am writing regarding the Puget Sound Energy LNG gas project that is proposed (and currently being built, unpermitted!) in Tacoma. Thank you for undertaking this review process; as the recently-released IPCC report indicates, it is critical that we fully understand the greenhouse gas implications of any proposed energy infrastructure projects, and that we must act boldly to block fossil fuel projects that will further imperil our climate.

There are innumerable issues with the draft SEIS as written. Perhaps most importantly, the SEIS does not use the appropriate Global Warming Potential (GWP) values for methane. The report relies on the 100-year values listed in the 2007 IPCC report (25), whereas the 2013 IPCC report updated this value to 28, and a more recent scientific paper (also by the IPCC authors), concludes the value is actually 32. Using the updated GWP figures would dramatically change the conclusions reached in the SEIS.

Furthermore, it is actually inappropriate to be using 100 year values at all. Given the urgency of the climate crisis (the IPCC report, typically a fairly conservative assessment, concludes that we have little over a decade to get our greenhouse gases to dramatically reduce our greenhouse gas emissions), it is not reasonable to be using 100-year GWP values at all. Methane is a far more potent greenhouse gas over a shorter time frame. Using the out-dated IPCC report, the 20-year GWP of methane is 72, and the value is 86 in the 2013 IPCC report. Obviously, using these more appropriate values would completely change the conclusions reached in the SEIS.

I respectfully request that the SEIS be revised to reflect the best available science and that a new comment period be opened following this revision.

Sincerely,

Dr. Katherine Muller

1891-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

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NOV 19 2018
Puget Sound Clean Air Agency

The Global Warming Potential values that were used in this draft supplemental EIS are not the latest accepted values. Using these outdated values (25 for 100 yr GWP) vs. the currently accepted values (32 for 100 GWP) greatly undervalues the global warming implications of this project. ~~Plus~~ This is a critical flaw (Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Katherine Muller Email: klm.wms2@comcast.net

Address: 2235 NE 43rd Ave, Portland, OR 97213

By completing this comment card you agree to receive updates about the project.

1802-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:53:23 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

#BanFrackingWorldwide

Sincerely,

Silvana Munivrana
munivra@libero.it
21000

1823-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: John Munter
To: Public Comment
Subject: Tacoma Liquified Natural Gas Project DSEIS--Public Comment
Date: Tuesday, October 9, 2018 10:51:31 AM

The DSEIS uses either antiquated data or incomplete data to make the case that natural gas from BC is acceptable.

The 100 year residence time in the atmosphere for methane emissions is terribly out-of-date. The IPCC AR4 used it eleven-going-on-twelve years ago. That was when climate change was off in the future. Since then the IPCC AR5 has also offered more reasonable time frames such as 20 years, 12 years, and even 10 years. If 10 years is used then methane is over 100 times worse than CO2 rather than 25 times worse as the DSEIS calculates. In fact, the DEIS doesn't even upgrade the 100 year figure to the current 33 times worse of the IPCC AR5 of 2013! In fact, there is no discussion of the reasonableness of the 10, 12, or 20 year time frames or the possibilities of coordinating these time frames with the 100 year CO2 metric.

One can even question whether the 100 year time frame for CO2 is even appropriate since only one-third of its effects happen within 100 years and a lot of them extend out 350 years. The IPCC current position is that methane is one-half the problem we have over current short term time frames. If we really want to do something about climate change we should not be permitting any more natural gas infrastructure. Over a 10 year time frame we can incur very serious feedback loops of loss of albedo in the arctic, release of methane from clathrates in shallow arctic seas, and release of methane from warming permafrost. It doesn't make any sense to extend out measuring effects for a century even considering The Project has a 40 year life span. It probably will become a stranded asset within twenty years as the entire planet transitions to solar where efficiencies are projected to double along with battery storage. Why not measure effects at 1,000 years and do away with all effects?

The second questionable data area concerns the BC-sourced natural gas. How do we know their supposed leakage rate is only .26%? Because BC says so? The Brandt study is not well discussed. Lots of non-quantified suppositions are thrown around like 'newer wells' but did anybody do an airborne independent study? Was the data just based on cherry-picked sites by industry? It is very curious that the BC leakage is roughly the same whether using conventional gas wells or fracked wells in contrast to US. US leakage data has also varied greatly over time and methodology.

In fact, "Data on sources of natural gas has been requested" is suspicious as foot-dragging. Supposedly it will fall somewhere around .26% but the whole murky data picture of BC is a real serious problem when trying to accurately decide whether diesel use is more polluting than natural gas or not. The DSEIS admits US natural gas is worse because of the leakage.

Has any research been done on none-fossil fuel replacements for diesel?

We need a way more rigorous look at the BC sources and more rigorous and up-to-date climate calculations before permitting more fossil fuel infrastructure. Climate change and its feedback loops are happening as we speak. We risk catastrophic feed-back loops and a 100 year time frame is not appropriate.

John Munter
Warba, MN

1779-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 2:06:47 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

LNG you are trading lives for money. Money cannot buy you and those you care about health if this is allowed to continue. There are so many options beyond fracking. You cannot spend money on a planet full of sick people. Greed is powerful don't fall into the trap see that fracking is killing people and killing our planet and no amount of money can buy health once you are damaged by fracking. Be bold be brave end this.

Sincerely,

Stephanie Murdock
stephtacilarone@hotmail.com
98513

0354-2 22. General Opposition
0354-2 7. SEPA Alternatives
0354-3 8. No Action Alternative
0354-4 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Cheryl K. Murphy

Address or email PtWoodworth@aol.com

I live within 1 mile of the LNG Tank. I think there should have given more thought into placing this tank there. + Planning

when we want to remodel or construct a home we are required to obtain approved permits. Not sure how they were able to construct without proper permits. Money should not override rule of law and treaties.

Would also like to see more come out on the alternatives to LNG. All we hear about is how LNG is the only way to clean air and reducing pollutants.

If this doesn't get stopped we will have no choice but sell our house and move further away.

2564-1 7. SEPA Alternatives
2564-2 10. LCA Calculations

From: Christopher Murphy
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 11:21:20 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I live less than a mile from the site of the PSE Storage facility. I have over 20 years experience in Hazardous Materials as a Haz Mat Technician for South King Fire and Rescue. I have been highly trained to respond to emergencies at storage facilities and dispersal sites, which includes Natural Gas. I am very concerned due to the size and the proximity to housing for the PSE facility.

I also am concerned with the statements made by PSE as to the reduction in airborne pollution by having ships convert to Natural Gas.

The newest research that is being done show that Fracted Natural Gas production releases many times the reported amount of Methane. This Methane is many times more destructive in the short term than Carbon Dioxide to Global Warming. PSE has also been bombarding the airwaves with very misleading television commercials. The facts are not being portrayed accurately. There are many shippers that meet the current regulations using bunker fuel, the addition of scrubbers cleans up the emissions and actually releases fewer of the most dangerous types of gases that are the most damaging to Global Warming.

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Christopher Murphy
ltmurphyc@comcast.net
1756 Pointe Woodworth DR NE
Tacoma, Washington 98422

2564-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2564-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2564-5 19. LCA Inputs and Assumptions - End Use
2564-6 14. LCA Inputs and Assumptions - Leakage/Slippage
2564-7 13. LCA Inputs and Assumptions - Natural Gas Source
2564-8 14. LCA Inputs and Assumptions - Leakage/Slippage

1863-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

1. LNG, by the time it gets to Puget Sound, has already had a long history of ~~does~~ environmental abuse, which will continue afterwards as well.
3. The LNG plant is sited on native American land.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Donna Murphy Email: murph1949@aol.com

Address: 2134 NE37 Portland OR 97212

By completing this comment card you agree to receive updates about the project.

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

I am commenting on specifically the increased awareness of the huge quantity of methane leaks from gas pipeline couplings. And the increased knowledge of the effect of methane on climate disruption, as noted in the IPCC research.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Donna Murphy Email: murph1949@aol.com

Address: 2134 NE 37 PHD OR 97212

By completing this comment card you agree to receive updates about the project.

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The full life cycle of methane and its dangers begins at the hydraulic fracturing stage and extends to the use of the gas as bunkering with marine fuel. The possibilities of methane leakage throughout the cycle are an enormous concern of mine. (Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Donna Murphy Email: pmurph1949@aol.com

Address: 2134 NE 37 Portland OR 97212

By completing this comment card you agree to receive updates about the project.

1898-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Please protect our waters and children of the present & the future. Honor tribal agreements. The future is in clean, renewable energy.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Stacy Murphy Email: stacy@cedarsanctum.net

Address: 3508 NE Simpson St Portland, OR 97211

By completing this comment card you agree to receive updates about the project.

0438-4 22. General Opposition
0438-4 8. No Action Alternative
0438-4 3. Outside of SEIS Scope
0438-4 14. LCA Inputs and Assumptions - Leakage/Slippage

Puget Sound Clean Air Agency,

PSE has shown its incompetence and its history needs to be included in the FEIS. Here are a few examples:

-You (the PSCAA) issued a notice of violation because PSE started construction without going through the agency's process. These small penalties do not affect big polluters like PSE.
-PSE did not evaluate tank safety & risks, only looked at small pipeline leaks
-PSE "safety recommendation" to handle leaks are for staff to wrap towels around leaks. LNG is
minus 260 and causes cryogenic burns or even death when in contact with the human body
-In 2016, a PSE gas line exploded and destroyed the Greenwood neighborhood in Seattle. They were fined $2,750,000 but only had to pay $1,500,000. PSE has not taken care of the community after the explosion. How will they manage a dangerous situation with the LNG facility? Since they are a Limited Liability Corporation, they will most likely pack up their things and leave since they won't be held liable.
-PSE has constructed the LNG without the proper permits. How can we trust them to uphold the conditions of the air permit? They have completely disregarded the public including the ratepayers.

I hope the PSCAA grows a spine and does not allow this to go on any longer.

-Roxann Murray

1493-1 5. Regulatory Framework

From: Roxann Murray
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 23, 2018 12:57:37 AM

To whom concerns,

I am very disappointed that the PSCAA did not consult the Puyallup tribe about the LNG plant. It is in direct violation to the Medicine Creek Treaty of 1854. The LNG project will be detrimental to the Puyallup Tribe by putting their treaty rights and community at risk. Treaty rights have more authority than any other governing body and they have been ignored throughout this whole process. I don't have much faith that the PSCAA will take what we say into account after all of the corruption I have seen in the last couple of years with this LNG plant, but I hope the PSCAA does the right thing and respect the Original People of the land by including the Puyallup Tribe in the SEIS.

On a personal note, I am part Native. The Great Sioux Nation to be specific, from a reservation in Eastern Montana, close to the area where some of the fracking will take place in North Dakota. In fact my reservation is just across the Missouri river from the fracking areas. As a result, I am getting harmed two fold because I am also a Tacoma resident and taxpayer.

-Roxann Murray
5313 N 39th St, Tacoma, WA 98407
253-355-1912

1576-1 22. General Opposition

From: Roxann Murray
To: Public Comment
Subject: LNG and PSCAA"s Strategic Plan/Commitments
Date: Saturday, October 27, 2018 1:17:15 PM

Dear PSCAA,

When I found out about the public hearing for the LNG facility, I wanted to know more about the Puget Sound Clean Air Agency. I went on your website and looked at the 2014-2020 Strategic Plan and saw a list of “commitments”. As you know, they are:
-Be good and wise stewards of the resources you give us
-Defend the future
-Prevent and reduce risk to you by upholding and enforcing the law
-Protect you from air pollution
-Tell you what’s in the air you are breathing

If you approve the LNG facility, you will be doing the complete opposite for each one of these commitments and you will be deemed untrustworthy to residents.

-Roxann Murray
253-355-1912

1577-1 21. LCA Inputs and Assumptions - Additional Air Pollutants

From: Roxann Murray
To: Public Comment
Subject: LNG facility and environmental racism (public comment for SEIS)
Date: Friday, October 26, 2018 1:48:09 PM

Dear PSCAA,

This is a public comment for the LNG facility at the Port of Tacoma. My concern is on environmental justice. The communities most impacted by fracking and LNG plants are communities of color. This includes from the extraction site to the final destination; numerous Tribes in B.C. and North Dakota (extraction sites), the Puyallup Tribe and the Northwest Detention Center aka immigration prison (final destination).

At public information meetings in 2017, the Puget Sound Air Agency informed us that the facility would release ammonia, arsenic, cadmium, hydrogen sulfide, and sulfur dioxide. LNG facilities threaten human and wildlife health by destroying air quality. The emissions units in this LNG facility will have a ground flare and vaporizer unit that will emit VOCs which have been linked to birth defects, cancer, and causing damage to the nervous system.

How can the PSCAA in good conscience approve the LNG facility. Please do not put anyone at risk.

-Roxann Murray

1585-1 3. Outside of SEIS Scope

From: Roxann Murray
To: Public Comment
Subject: LNG safety
Date: Saturday, October 27, 2018 1:13:40 PM

To whom it concerns,

This is a public comment for Puget Sound Energy's disastrous LNG project. PSE has shown its incompetence and its history needs to be included in the FEIS. Here are a few examples:

-You (the PSCAA) issued a notice of violation because PSE started construction without going through the agency's process. These small penalties do not affect big polluters like PSE.
-PSE did not evaluate tank safety & risks, only looked at small pipeline leaks
-PSE "safety recommendation" to handle leaks are for staff to wrap towels around leaks. LNG is
minus 260 and causes cryogenic burns or even death when in contact with the human body
-In 2016, a PSE gas line exploded and destroyed the Greenwood neighborhood in Seattle. They were fined $2,750,000 but only had to pay $1,500,000. PSE has not taken care of the community after the explosion. How will they manage a dangerous situation with the LNG facility? Since they are a Limited Liability Corporation, they will most likely pack up their things and leave since they won't be held liable.
-PSE has constructed the LNG without the proper permits. How can we trust them to uphold the conditions of the air permit? They have completely disregarded the public including the ratepayers.

I hope the PSCAA grows a spine and does not allow this to go on any longer.

-Roxann Murray

1811-1 3. Outside of SEIS Scope

From: Roxann Murray
To: Public Comment
Subject: Regarding LNG (public comment)
Date: Tuesday, October 23, 2018 9:50:55 PM

Dear PSCAA,

Have you heard of Talequah? She is a 20-year-old female orca who gave birth to a female calf that died after half an hour. While many orca mothers have been seen carrying the bodies of their dead calves for a day or so, Tahlequah did so for 17 days showing humanity the damage we have done. I weeped for them.

In August, biologists tried to help an emaciated and ailing three year-old killer whale (born December 2014), J50 also known as Scarlet, of the critically endangered Southern Resident population. J50 appeared lethargic. Scientists observing her agreed that she was in poor condition and may not survive. Responders from NOAA Fisheries and partner organizations were exploring options ranging from no intervention to providing medical treatment, potentially delivered in a live Chinook salmon, which has never before been attempted in the wild. J50 has not been seen since September 13th.

New fossil fuel projects have absolutely no business in such a fragile and diverse area like the Salish Sea, especially when the effects of these projects on the wildlife is not included in the SEIS. I am requesting that the local wildlife including endangered species like orcas, be included in the FEIS. They are a part of the web of life and this is not some hippy-dippy philosophy, this is science and truth.

-Roxann Murray
5313 N. 39th St. Tacoma, WA 98407

1812-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Roxann Murray
To: Public Comment
Subject: Regarding LNG public comment
Date: Wednesday, October 24, 2018 7:43:29 PM

To whom it concerns,

I am not understanding why the LNG facility has a 40 year plan even though the United Nations Intergovernmental Panel on Climate Change reports that we must change our fuels in the next 12 years or face severe consequences (where hurricanes are just seen as the weather and all the polar bears are extinct because there is no more ice in the Arctic). The LNG plant will speed up methane emissions and also lock Washington State into a 40 year plan, well beyond the 12 years we have to clean up our act. Also, this facility will be impacted by rising sea levels due to climate change at the Port of Tacoma.

I encourage you to read the IPCC report here:
http://www.ipcc.ch/report/sr15/

-Roxann Murray

1816-1 22. General Opposition

From: Roxann Murray
To: Public Comment
Subject: SEIS public comment
Date: Friday, October 26, 2018 2:20:43 PM

Dear PSCAA,

This is concerning the LNG facility in Tacoma. As a Tacoma resident and taxpayer, I request that the SEIS includes an analysis of cleaner peak shaving alternatives and look into where all of this fracked gas is going to be used.

-Roxy Murray

1582-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing

From: climatefirstresponders
To: Public Comment
Subject: LNG production and transport
Date: Saturday, October 27, 2018 1:16:00 PM

To whom it concerns,

The SEIS for the fracked gas facility should include the effects from the extraction site to the production site. This LNG facility does not stop at Tacoma. For example, the current analysis does not include the effects of using and transporting sand/water for the fracking wells. 2-8 million gallons of water may be used to frack a well. Some wells consume much more. A well may be fracked multiple times, with each frack increasing the chances of chemical leakage into the soil and local water sources. The SEIS also does not include GHG emissions from diesel trucks that are used to transport water and sand to the wells.

-Roxy Murray

1852-1 22. General Opposition

From: Beverly Naidus
To: Public Comment
Subject: Writing on behalf on my students & neighbors
Date: Monday, November 19, 2018 1:05:18 PM

Hello - I am writing on behalf of my students and neighbors. I have been on the faculty at UW Tacoma for the past 15 years. I teach ecological art and my students and I are very aware of the superfund sites in the Port of Tacoma as well as the contamination of the water of Commencement Bay as well as the soil in the area. We are

From: Beverly Naidus
To: Public Comment
Subject: Writing on behalf on my students & neighbors
Date: Monday, November 19, 2018 1:12:08 PM

Hello - I am writing on behalf of my students and neighbors. I have been on the faculty at UW Tacoma for the past 15 years. I teach ecological art and my students and I are very aware of the superfund sites in the Port of Tacoma as well as the contamination of the water of Commencement Bay and the soil in the area.

We are very concerned about the proposed LNG refinery financed by the Australian multi-national corporation called Puget Sound Energy. We don't think that they care about our local community, and are willing to spend $$$$ to convince us that this project is safe. It is not safe. Fracked gas is not safe. LNG is not safe. There have been explosions at many LNG refineries across the nation. This is a very dangerous project and at UWT we are in the "blast zone." We are already contending with unhealthful air many days per year, and having this refinery in the Port will not improved things in any way. The risks are far too great to allow this refinery to go online.

When I try to teach my students about the potential to heal superfund sites and develop remediation projects to make our community healthier and happier, the fact that city authorities are inviting more fossil fuel companies to contaminate our Port makes no sense. Our students experience a cognitive dissonance. It makes them feel that no one cares about their safety or the health of their families.

Please act with caution and do not approve PSE's permit. We need a fossil fuel free port filled with remediation projects, truly green energy and permaculture design. All of the latter will create more jobs and more community health.

THANKS!

Sincerely,

Beverly Naidus
Associate Professor of Interdisciplinary Arts
UW Tacoma

1242-1 23. General Support

Steve: Thank you. Next up is Abigail Castle. Abigail? Lynn Fitz Hugh? Lynn? Meredith Neal?

Meredith: Good evening. My name is Meredith Neal, and I am the director of the Manufacturing Industrial Council for the South Sound. I encourage you to approve the air permit for the Tacoma liquid natural gas facility.

[03:49:00] We all want a cleaner future. I live here in Tacoma, and I'm raising my kids here. And I want to make sure that my children and all of our children grow up in a place that is healthy and vibrant. LNG is an incrementally better step towards a cleaner future. Bunker fuel is a dirty fuel that is terrible for local air quality releasing high particular matter, sulfur, and nitrogen oxides into the air. Commercial vessels of all sizes are looking for a cleaner alternative. The fuel of choice is LNG. We have a wonderful resource here with the Port of Tacoma with over 40,000 jobs, good family wage jobs.

We need to make sure that our port remains competitive. And having the preferred fuel source available is an important step in keeping global trade lines open. We recognize a shared responsibility for a clean community. Industry in the tide flats continues to lead by introducing clean energy options and transforming old materials into new products. Change takes time and requires infrastructure and demand for emerging options.

[03:50:03] There is demand for LNG from the maritime industry. Please allow this facility to open and start fueling. I want a region with opportunity for all. A vibrant tide flats area with good living wage jobs that is moving towards sustainability is the key to shared prosperity in our region. I encourage you to issue the air permit without delay and improve our local air quality. Thank you.

Steve: Okay. Let me identify the next group after the first five coming up. It's Nanette Reetz, Seth Storset, Melissa Malott, Nickie Walters, and Elisabeth Parker.

1772-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:27:46 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Erika Nedderman
ehnedderman@gmail.com
98117

Steve: Thank you.

[06:15:00] Next up is Ben Nelson.

Ben: Thanks for letting me have a second up here to chat about this, too. My name is Ben Nelson. I'm 27 years old. I grew up in Portland, Oregon. I spent four years of my time in Eugene going to school down there. And, at the forefront of education, for me, was always innovation and environment. And it's funny that we get here today, and that's exactly what we're looking at. My last six years in Tacoma, frankly, started out a little rocky. It did have the Tacoma aroma, the place that smelled kind of funny between Portland and Seattle. That's what I grew up knowing it as. And over the last six years, I've learned to call this home.

It's everything that I've wanted in a city, and it's showing innovation. It is where I want to be. It is where I want to raise a family. I don't want to run back to Portland. I don't want to be next to where my family is. And a lot of that has to do with the innovation that Tacoma has shown, the gentrification that's taken place here, over the last number of years.

[06:16:04] And a lot of that TOTE has shown as well. And I don't claim to be a scientist, but it's easy to see the facts. And people have run through them a number of times tonight, but 100% reduction in SOx, 99% reduction in particular matter, the smoke that we're breathing, 90% reduction in nitrogen oxides, 13.5% reduction in greenhouse gases. Again, I don't claim to be a scientist, but I do claim to know how to read and to vet what you guys have put out there in the EIS. Maybe I am dyslexic.

Nonetheless, in conclusion, I speak in full support of the LNG plant and innovation that's been shown by PSE, the initiative to move forward and be a trendsetter in the industry by TOTE. And, frankly, just the continued growth of Tacoma. I'm proud to be here. Thank you guys very much.

1473-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1473-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Bonnie New
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 8:53:51 PM

Name: Bonnie New
Email: bnew1@live.com
Address: 4045 Stonegate Dr. -
Hood River, Oregon 97031

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I am writing to urge reconsideration of the SEIS for Puget sound Energy's fracked gas project in Tacoma.

The draft SEIS is flawed and thus highly misleading. It uses an outdated methane global warming potential (GWP) value – the UN's 2007 value of 25 instead of the 2016 value of 32. The SEIS fails to take into account that methane is significantly more potent in the near-term (the analysis only looks at long term impact). The SEIS also fails to take into account that the burning, production, processing, storage, transmission, and distribution of fracked gas causes significant leakage of methane into the atmosphere. Including likely methane leaks in the analysis shows fracked gas to have climate impacts that rival those of coal.

2217-1 13. LCA Inputs and Assumptions - Natural Gas Source
2217-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2217-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Bonnie New
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 10:50:05 PM

Name: Bonnie New
Email: bnew1@live.com
Address: 4045 Stonegate Dr. -
Hood River, Oregon 97031

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Puget Sound Clean Air Agency,

I'm writing to voice my concern with the October 8 draft report on the Puget Sound Energy Liquefied Natural Gas project proposed for Tacoma. I urge you to consider, when revising the draft SEIS, the following important technical deficiencies that have been pointed out by analysts –
1. It's not possible to guarantee that PSE will source all of its natural gas from Canada, where leakage rates are reportedly lower.
2. The report uses a 100 year span for its estimates, even though the lifespan of the facility is supposed to be 40 years.
3. The report should use the 20 year value for the methane's GWP rather than the 100 year value. 20 year is by far the more relevant time frame given the absolute urgency of acting on climate change.

Correcting these deficiencies changes the outcome of the analysis, showing that the project will indeed be a significant burden for our climate, and one that we can NOT afford.

The IPCC's most recent report is both alarming and compelling. The panel scientists are unequivocal that we must transition immediately to renewable, carbon-free energy sources. We CAN NOT afford to further the use of fossil fuels by continuing to build infrastructure such as the Tacoma project and stoke markets around the world. It is a human health imperative. It's an environmental imperative. And it's a moral imperative. We CAN NOT continue to ruin the world that has to sustain our children.

1521-1 3. Outside of SEIS Scope

From: David Nez
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:02 PM

Name: David Nez
Email: dnez@hevanet.com
Address: 8951 N. van Houten ave -
Portland, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Fracking is terrible for the environment, poisoning the water table with toxic chemicals. It is an insane technology and should be banned for the good of future generations! Residents in states like Pennsylvania are regretting the decision to let fracking occur on their land--poisoned wells, livestock, increased cancer, etc. Lets not open the door for this monstrous technology in the Pacific NW!

0367-1 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Pamela Ng

Address or email greykoala65@yahoo.com

Hope U.S. can be like Germany and create 400 thousand (400,000) green jobs in the green renewable energy industries:

Solar panels manufacturing;
tidal turbine manufacturing;
wind turbine manufacturing;
geothermal development;
algae growing;
AND the maintenance of all the above.

Carole: Thank you. The next set of five is Pamela Ng, Derek Patches, Stuart Zimmerman, Dr. Lisa Johnson, and Mary Paynter. So, Pamela Ng is the first one. And two minutes, please.

Pamela: I wasn't expecting I was the first one. I probably won't take two minutes.

[01:52:00] I am a citizen of the US and on earth, actually. And I probably won't live long enough to see how the earth, the environment has been damaged. But I would like to see the Clean Air Agency take a step back, instead of just concentrating on clean air, think about the clean environment. And, actually, the natural gas that's fracked is damaging the entire environment, instead of just clean air. So, before we even breathe in the methane, breathe in the small particulates in the air that's been burned, the water would be bad, in the fracking process.

[01:53:00] So, I would like to see the Clean Air Agency take a step back and think about the whole environment. And I'm so glad the corporations have actually admitted that they are putting in a lot of money and investment into this project, or their projects. But I would like to think that they can take a different focus into thinking about other renewable resources, other renewable energies, so they can put in money, investment in solar energy, tidal turbines, wind turbines, and all of that. But they probably lack the determination. So, maybe the government can give them that determination and give them that push, the jolt in doing that.

[01:54:00] Thank you.

1336-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1336-2 13. LCA Inputs and Assumptions - Natural Gas Source
1336-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Levin Nock
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, November 19, 2018 9:34:05 AM

Name: Levin Nock
Email: lnock9@gmail.com
Address: 1173 NE 71ST AVE -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

To the Puget Sound Clean Air Agency,
The latest IPCC report emphasizes that building any new fossil fuel infrastructure is an unconscionable threat to our homes and families. Yours and mine. I used to worry about a retirement plan. Now I'll be happy to settle for a livable retirement planet.
Considering that, thank you for reviewing the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. While requiring an SEIS was a good idea, the actual SEIS produced is woefully lacking in scientific rigor, and needs to be updated accordingly

Here are some of the scientific issues with the SEIS as I understand them:
The SEIS used the 100-year Global Warming Potential (GWP) of methane, when the 20-year value is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
The facility is projected to have a 40 year lifespan, so there is no legitimate reason to average out the impact over 100 years.
The SEIS claims emissions benefits from customers that Puget Sound Energy does not have and is unlikely to get. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. In a worldwide fleet of 90,000 ships, considerably less than 1% use LNG. The timing and extent of further LNG conversions is uncertain at best.
The SEIS should emphasize clearly that the plant will increase emissions when any natural gas is sourced from the US--particularly considering that recent measurements taken in the field have shown that leakage rates are much much worse in the US than in Canada. PSE's recent filings show they relied on gas from BC, Alberta, and the US—with no provisions to exclude gas from the US. With the recent pipeline explosion in BC that interrupted PSE's supply, Canadian gas is not always available.
The SEIS uses a lower rate for fuel slippage in ships, than is considered best practice. But then I suppose since PSE made up imaginary ships, why not imagine unrealistically clean and efficient ships?

Beyond these scientific shortcomings, my other issues with the project include the legal and moral risks related to its siting on Puyallup Tribal lands without consent; taxpayer and ratepayer subsidization, and safety issues at multiple scales (local, regional, global).
Thanks again for initiating this crucially important review of this facility. Please use the best available science and risk management when revising this draft SEIS.
Thank you,

1595-1 22. General Opposition

From: Margi Nowak
To: Public Comment
Subject: my public comment to Puget Sound Clean Air Agency
Date: Thursday, November 15, 2018 10:08:42 AM

Few people are fooled by the constantly-running ad that tries to contrasts “dirty bunker fuel” with “clean-burning LNG”. Yes, if all goes right (no accidents with the LNG for at least a millennium, long after we are all dead but our descendants are not), the actual burning of the fuel is indeed “cleaner” … BUT HOW DID WE GET THAT FUEL?

Luckily for us, our Washington State geological structure does not include oil trapped in shale rock buried deep underground, so we can pretend that what takes place elsewhere on our planet, in our country, doesn’t affect us - because we don’t see it daily. Permanent poisoning of the water table. Earth turned into pools and pits of deadly poisons. Air so toxic people must move far away from their family’s homestead (at whose expense?). Animals - both pets and food sources - poisoned. No healing possible for thousands of years. And that’s only the extraction process of hydraulic fracturing (“fracking”). Transporting and storage? Industry is blissfully childlike in thinking of consequences in terms of tiny little increments of time (“Should be safe for the next 20 years…”)

What’s utterly lacking in this oh-so-limited focus on immediate bottom-line financial benefits is an interconnected, long-range, planetary scale of judgment. If our descendants are still alive 500 years from now, what will their world, their health, their hopes for the future be like? If deciders today honestly don’t care, because they will be long dead by that time, then acknowledge this in your ads! Juxtapose those shots of Commencement Bay, with blue skies in the horizon, with shots of some Wyoming cesspool of horrors, with abandoned farmhouses and ghastly animal corpses all affected by the fracking process. Only then can you contextualize the true cost of ending the burning of “dirty bunker fuel”. It is time to prioritize non-deadly, truly long-range, planetary scale alternatives!

Margi Nowak

1764-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:49:27 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Bridget OBrien
ob.bridget@gmail.com
98109

0623-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

It is my understanding that there is no real knowledge about the aggregate health effects of multiple toxins that would be released from the refinery. The refinery should not be approved without extensive long-term studies are conducted.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kelly O'Hanley MD MPH	Email: kohanley@gmail.com
Address: 6134 NE Alameda St Portland, OR 97213	Phone: 503-880-8844

0624-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

It is my understanding that there is lack of knowledge about the combined effects of very fine particulate matter plus toxins. It is irresponsible to approve of a refinery until this is known. Please deny it.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Kelly O'Hanley MD, MPH	Email:	Kohanley@gmail.com
Address:	6134 NE Alameda St	Phone:	503-880-8841

0625-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am a physician with an additional degree in public health. I have devoted a lifetime to protecting the health of babies & children. But the specter of climate change dwarfs any efforts any of us can make to improve health. If continued, it will destroy all our health. We need a renewable energy transition. Do not allow this refinery.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kelly Ohanley MD MPH	Email: kohanley@gmail.com
Address: 6134 NE Alameda St	Phone: 503-880-8844

0626-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

We know that carcinogenic toxins will be released from the refinery if it is approved. What we do not know well is the long term impact of them some cancers can take a long time to develop
Please deny. Do not approve - for the sake of all near-by residents.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kelly O'Hanley	Email: kohanley@gmail.com
Address: 6134 NE Alameda St	Phone: 503-886-8844

Carole: Thank you. Kelly O'Hanley?

Kelly: Good late afternoon. My name is Dr. Kelly O'Hanley. I am an obstetrician gynecologist. I have a degree in public health. I've taught at Stanford and Harvard Universities. And I've worked in 40 countries around the world. And I'm coming partly on behalf of mothers and babies who can't be in front of you today. Our government's fundamental duty is to safeguard our lives and our property.

[02:43:00] Our government has known for decades that the continued burning of gas, oil, and coal is causing global warming and making it dangerous and uncontrollable destabilization of the planet's climate system. Fossil fuels must be phased out as rapidly as possible. And only governments can ensure this will happen. The government holds the power through its permitting process to stop the expansion of fossil fuel infrastructure. Puget Sound Clean Air Agency can't exercise its moral and legal authority. It can put the brakes on this project and on the nation's suicidal march toward climate chaos. Please decide wisely. Thank you.

1486-1 22. General Opposition

From:	Kelly O"Hanley
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, November 20, 2018 8:24:09 PM

Name: Kelly O'Hanley
Email: kohanley@gmail.com
Address: 6134 NE Alameda St -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

California is burning up. The Pacific Northwest has had recent horrible fires. Climate change is all to real and will get progressively worse.
Please use your authority - deny this project.
Let's move quickly quickly to renewable energy.

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2160-1 3. Outside of SEIS Scope

We know that carcinogenic toxins will be released from the refinery if it is approved. What we do not know well is the long term impact of them since cancers can take a long time to develop
Please deny. Do not approve - for the sake of all near-by residents.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Kelly O'Hanley	**Email:**	kohanley@gmail.co
Address:	6134 NE Alameda St	**Phone:**	503-886-8844

2161-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am a physician with an additional degree in public health. I have devoted a lifetime to protecting the health of babies & children. But the specter of climate change dwarfs any efforts any of us can make to improve health. If continued, it will destroy all our health. We need a renewable energy transition. Do not allow this refinery.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Kelly O'Hanley MD MPH	Email: kohanley@gmail.com
Address: 6134 NE Alameda St Portland OR 97213	Phone: 503-880-8844

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2162-1 3. Outside of SEIS Scope

It is my understanding that there is lack of knowledge about the combined effects of very fine particulate matter plus toxins. It is irresponsible to approve of a refinery until this is known. Please deny it.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Kelly O'Hanley MD, MPH	**Email:**	kohanley@gmail.com
Address:	6134 NE Alameda St Portland, OR 97213	**Phone:**	503-880-8841

2163-1 3. Outside of SEIS Scope

lear Puget Sound Clean Air Agency,

It is my understanding that there is no real knowledge about the aggregate health effects of multiple toxins that would be released from the refinery. The refinery should not be approved without extensive long-term studies are conducted.

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Kelly O'Hanley MD MPH	Email:	kohanley@gmail.com
Address:	6134 NE Alameda St Portland, OR 97213	Phone:	503-880-8844

1340-1 22. General Opposition
1340-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1340-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Kayleigh O"Hara
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, November 18, 2018 3:33:56 PM

Name: Kayleigh O'Hara
Email: kayleigh.marchand@gmail.com
Address: 5318 NE 16th Ave -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Thank you for providing this opportunity to comment on the life cycle environmental impacts of the proposed Puget Sound Energy (PSE) Liquefied Natural Gas (LNG) project in Tacoma. As you're aware, the recent Intergovernmental Panel on Climate Change (IPCC) report gives our global economy 12 years to change our energy infrastructure (among others) to avoid the most catastrophic effects of climate change. Your willingness to examine the impacts of natural gas on the climate during this critical phase is commendable.

As others have called out, there are some issues with your draft report from October 8th. First is the issue of methane leakage. The report claims that all gas for the project will come from British Columbia, and that gas from BC is "cleaner" than from other sources due to lower rates of leakage. However, PSE's own filings indicate that gas will also come from Alberta and various sources in the United States. Even if the assumption about BC gas being cleaner were true, BC wouldn't be the sole source of gas. Beyond that, the given rate of leakage for BC gas was provided by industry reports instead of by impartial analysts. Correct estimates of methane leakage are significantly higher, and it is critical that accurate estimates are used.

Second, the report uses the 100-year Global Warming Potential (GWP) value for methane. The 20-year value would be far more relevant given both the narrow 12-year window for action recommended by the IPCC and given the lifespan of methane in the atmosphere. Methane will have over 80 times as much of an impact on climate change as carbon during this critical 12-year time. Although it will decay faster than carbon in the atmosphere, that will happen long after we're able to stop the worst predictions for the climate. Please use the more relevant 20-year GWP value.

On a more personal note... I grew up in the Puget Sound area and still visit frequently. PSE was my energy provider for many, many years. It is difficult to watch the northwest face fires fueled by climate change, to see people walking down the streets with face masks to try and stave off the negative health effects of the smoke. The fact that PSE is willing to contribute to this crisis, to bank on an energy source that is helping blanket the northwest in smoke, is deeply saddening. At the very least, PSE owes the communities they'll be affecting an accurate estimate of their impacts.

Thank you again for this opportunity to comment.

Sincerely,
Kayleigh O'Hara

1391-1 22. General Opposition

From: Maureen O"Neal
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:17 PM

Name: Maureen O'Neal
Email: momoneal77@gmail.com
Address: 9100 s.w.80th ave., -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please protect Puget Sound!

1403-1 22. General Opposition

From: Maureen O"Neal
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:03 PM

Name: Maureen O'Neal
Email: momoneal77@gmail.com
Address: 9100 s.w.80th ave., -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please protect Puget Sound!

1415-1 22. General Opposition

From: Maureen O"Neal
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:52 PM

Name: Maureen O'Neal
Email: momoneal77@gmail.com
Address: 9100 s.w.80th ave., -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please protect Puget Sound!

1417-1 22. General Opposition

From: Maureen O"Neal
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:43 PM

Name: Maureen O'Neal
Email: momoneal77@gmail.com
Address: 9100 s.w.80th ave., -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please protect Puget Sound!

1437-1 22. General Opposition

From: Maureen O"Neal
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 8:00:38 PM

Name: Maureen O'Neal
Email: momoneal77@gmail.com
Address: 9100 s.w.80th ave., -
Portland, Oregon 97223

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please protect Puget Sound!

1351-2 22. General Opposition
1351-2 21. LCA Inputs and Assumptions - Additional Air Pollutants

From: John O"Renick
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 5:54:27 PM

Name: John O'Renick
Email: jman97216@gmail.com
Address: That's more personal info than I want to leave here -
Portland, Oregon 97216

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It must take a particularly virulent sort of psychopath to steal the future from one's own grandchildren. No one who is honest about it, who has half a brain, an ounce of integrity and even a smidgen of education in science, can any longer deny that climate change is here, that it is caused by humans stupidly dumping greenhouse gasses into the atmosphere, that it is already costing us billions of dollars and innocent lives and creating climate refugees right here in the U.S.A. and in the Middle East, and contributing to our ongoing, accelerating mass extinction. You don't have to study much paleontology to realize that we—you—are trying to recreate the End Permian mass extinction, in which 90% of everything died out, dumping CO2 and methane into the atmo until both ends of the planet melt and rot and belch megatons of methane, in an exponentially self-reinforcing feedback loop that can shoot the temperature of the planet up five degrees or more practically overnight—and that we will not be able to stop once it is well started. And it is already started. That you in the fossil fuel industry would knowingly condemn you own children or grandchildren to misery and death and the human race to possible extinction just to line your own pockets a little longer makes yours the worst crimes against humanity in the long sad history of crimes against humanity.

The deliberate flaws in your SEIS are obvious. You deliberately used obsolete numbers for the global warming potential of methane, deliberately underestimated the amount you leak to atmosphere—much of it bubbling up through and destroying groundwater resources on the way—and overestimated the number of customers for your LNG. You are ignoring the treaty rights of the Puyallup Tribe, the harm you are doing to the native peoples of British Columbia, and the poisons--ammonia, arsenic, cadmium, hydrogen sulfide, sulfur dioxide—you will dump into the Seattle-Tacoma airshed and into already-moribund Puget Sound. Like the Republicans in congress you have bribed out of any integrity they ever had, you will lie, cheat, and steal to go from filthy rich to filthier. I want the lot of you, the entire fossil-fuel industry, prosecuted for that.

By eminent domain if nothing else, the fossil fuels under this land belong to the people. You steal them at 12 cents on the dollar, suck them out of the ground and sell them off to China AFAP, inefficiently and wastefully to keep it cheap, knowing that you are accelerating global warming like pumping gasoline on a high-rise fire and knowing full well what the consequences for the future of the human race will be. You—the fossil fuel industry—squander these the people's resources deliberately, to bring back scarcity and high prices, from which you profit more than from the current glut; and some of you to bring back war for other people's oil, from which you profit far more, at taxpayer expense. We have not forgotten Dick

Cheney and Haliburton and millions of meals not served.

I can’t imagine being so completely selfish. And I am tired of living in a world run by psychopaths. Psychopathy may be at least partly genetic. Maybe there is a key in that to weeding it out of the human gene pool. If we survive you long enough.

John O’Renick
Portland

2205-5 12. LCA Inputs and Assumptions - Global Warming Potential Value
2205-5 13. LCA Inputs and Assumptions - Natural Gas Source
2205-5 7. SEPA Alternatives
2205-5 7. SEPA Alternatives
2205-5 5. Regulatory Framework

From: brettbos@everyactioncustom.com on behalf of Brett O"Sullivan
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 12:54:41 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine can NOT bring a clean energy future by continuing to use fossil fuels, with all their catastrophically bad impacts. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals.

This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2)

For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

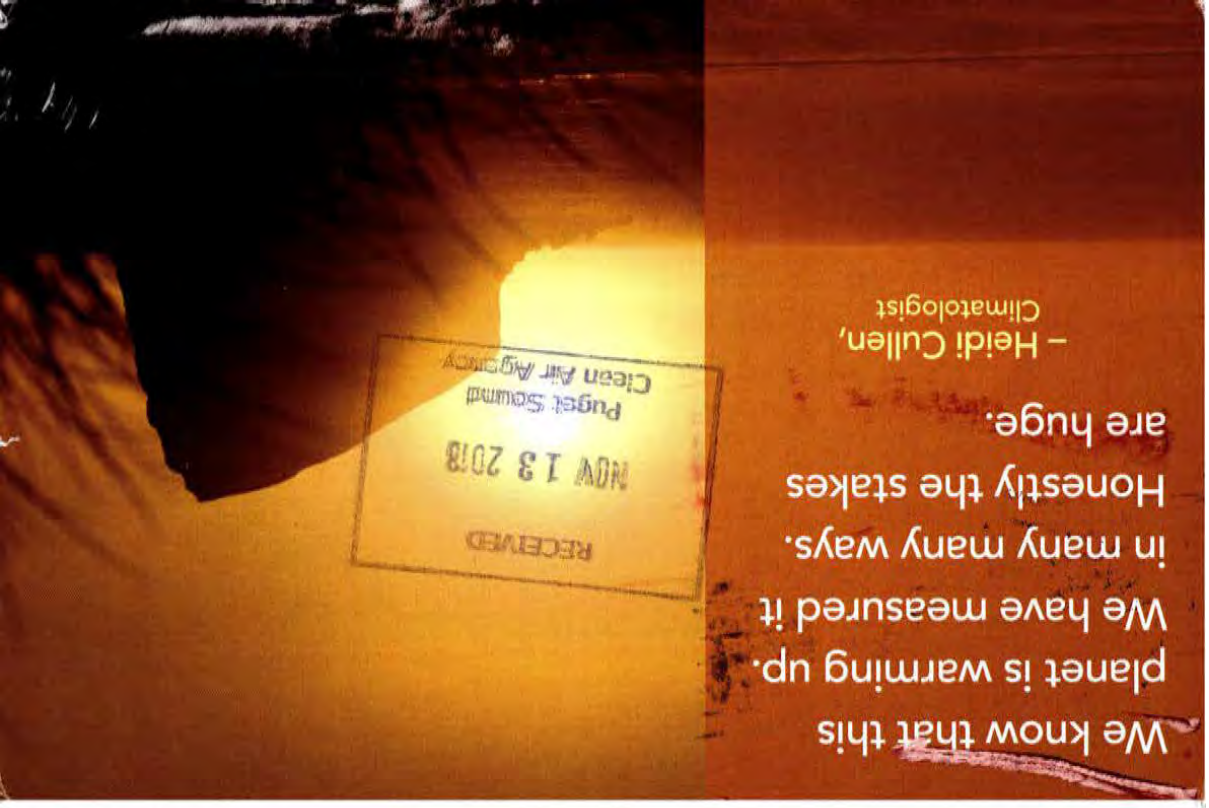
Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Brett O'Sullivan

Lafayette, CO 80026
brettbos@yahoo.com

1912-1 22. General Opposition



weather.climate25.com/voices
Photo courtesy of and © Greg Vaughn
www.GregVaughn.com

Taryn Oakley
1608 SE 48th Ave.
PDX OR 97215

PORTLAND OR 972
09 NOV 2018 PM 6 L

I am writing today to oppose the fracked gas project that has been proposed for Tacoma. Methane, especially methane coming from a fracked source is NOT a long-term solution. Methane is a strong greenhouse gas + any leaks will contribute to a warmer planet. GO RENEWABLE + SAY NO to fracked gas. Taryn Oakley

TO:
Puget Sound Clean Air Agency
ATTN: Public comment DSEIS,
PSE LNG Project
1904 3rd Ave
Suite 105
Seattle, WA 98101

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0588-2 11. LCA Inputs and Assumptions - General
0588-2 16. LCA Inputs and Assumptions - Hydraulic Fracturing

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about all of the air pollution from deisel trucks used in the fracking process, shipping, transporting the gas. please study all vehicle emissions from the entire process. (including the commuting of workers to & from fracking sites & construction of these facilities.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Stacy Oaks	Email: eddyssunprincess@gmail.com
Address:	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

Treaty rights are supreme law of the land. It is illegal, immoral & perpetuates the continuation of genocidal policies to move forward on projects that affect tribes, against their will. HONOR THE TREATIES!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Stacy Oaks	Email: eddyssunprincess@gmail.com
Address:	Phone:

Carole: Thank you. Stacy Oaks?

[02:28:00]

Stacy: Hello. My name is Stacy Oaks. I'm a wife, a sister, daughter, an auntie, and a grandmother. I've been blessed to live along the Salish Sea my entire life. I'm a water protector and an organizer with 350 Seattle. I want to first acknowledge because it's really important that we are standing here today on the land of the Puyallup Nation, on land that they have cared for since time immemorial and that they still care for today. The bones and the souls of their ancestors are in everything that we see and touch today.

And it's really sad that we are standing here debating the negative effects of a project that they have said they don't want here. I want to officially say that, on behalf of 350 Seattle, we incorporate by reference the comments of the Puyallup Tribe and agree with their statements.

[02:29:06] And I want to use the rest of my time to talk to you in my official capacity as an auntie and a grandmother. We only have a handful of years left. And I think you all know that, like know that. And so, if we don't do our part right now, the young ones in our lives today don't even get a chance. The door will be shut. We're beyond them doing what we should be doing right now. So, with that in mind, thinking of them, hold them in your thoughts the entire time you're working on this project. Every decision you make should be from here. Every one. Are you going to be able to look them in the eye in 10 years and say I did everything I could?

[02:30:02] Or are you going to have to say that you let corporations self-report and that you didn't even use best available science because of technicalities? What will you do with your handful of years?

1731-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 7:56:47 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency's analysis is based on 100-year, not 20-year, global warming potential (GWP) values. Given the IPCC report that was released last month indicating that we have 12 years to avoid climate catastrophe, the Clean Air Agency should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the "dirty fuel" it's supposed to replace.

Our children's future is on the line - using old data is absolutely criminal with the stakes so high.

Sincerely,

Stacy Oaks
eddyssunprincess@gmail.com
98271

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2127-1 5. Regulatory Framework

Treaty rights are supreme law of the land. It is illegal, immoral & perpetuates the continuation of genocidal policies to move forward on projects that affect tribes, against their will. HONOR THE TREATIES!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Stacy Oaks	Email: eddyssunprincess@gmail.com
Address:	Phone:

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am concerned about all of the air pollution from deisel trucks used in the fracking process, shipping, transporting the gas, please study all vehicle emissions from the entire process. (including the commuting of workers to & from fracking sites & construction of these facilities.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Stacy Oaks	**Email:** eddyssunprincess@gmail.com
Address:	**Phone:**

1680-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 9:23:47 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

We cannot fix one air problem by causing another.

Please do everything in your power to look beyond the industry tainted data presented in the draft SEIS.

Sincerely,

Stacy Oaks
eddyssunprincess@gmail.com
98271

1681-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 8:30:24 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution.

Stop environmental racism.
Stop putting the health of corporate earnings over the health of the people.

We can do better.

Sincerely,

Stacy Oaks
eddyssunprincess@gmail.com
98271

1702-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 9:31:10 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Ignoring treaties is to continue centuries of genocide.

Sincerely,

Stacy Oaks
eddyssunprincess@gmail.com
98271

1709-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 8:12:04 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

On behalf of my organization, 350 Seattle, I incorporate the testimony of the Puyallup Tribe into my own.

Sincerely,

Stacy Oaks
eddyssunprincess@gmail.com
98271

2566-1 22. General Opposition
2566-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2566-3 13. LCA Inputs and Assumptions - Natural Gas Source
2566-4 1. Determination of SEIS Scope - Comparison to FEIS
2566-5 10. LCA Calculations
2566-6 5. Regulatory Framework

From: hogilvy@everyactioncustom.com on behalf of Heather Ogilvy
To: Public Comment
Subject: An appeal for common sense regarding Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 8:17:21 PM

Dear Puget Sound Clean Air Agency,

As a child psychologist and trauma specialist I appeal the you to prevent the Tacoma LNG SEIS From going online. This is not a "green solution" as PSE has billed it. Nor is it for our communities served by them. Rather it is an extreme danger to those near it on the reservation particularly, but also to the industry around it as well as the nearby school and daycare center. I do not need to give you the scientific details. I am sure you have researched them and the accidents from this kind of terminal. The trauma of even a small accident will cost much in suffering and resources.

An acceptable environmental impact report is not done. The Puyallup tribal treaty has not been respected. The financial impact on surrounding industry as well as any boat traffic/ shipping has not been considered well enough. Tankers coming in and leaving require that no water traffic be within 1 mile on each side of them.

Aside from the immorality of this proposal, putting profit above humanity, the economic costs,even without any accidents, are huge.What sense does it make to put online another fossil fuel project, for it is that despite PSEs claim, when the terminal will be obsolete before a decade is out?

Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and

global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Dr Heather Ogilvy
208 5th St Langley, WA 98260-9622

2566-6 cont'd 5. Regulatory Framework
2566-7 7. SEPA Alternatives

2024-1 23. General Support

From: Tom Ohaus
To: Public Comment
Subject: TOTE/LNG
Date: Thursday, November 15, 2018 3:04:14 PM
Attachments: TOTE-LNG.pdf

Comments on TOTE LNG plan attached.

--
Captain Tom Ohaus
Owner/Operator Angling Unlimited
http://www.AnglingUnlimited.com
cell: 508-415-0780

November 15, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

Thank you for the opportunity to comment on your Agency's supplemental Environmental Impact Statement (SEIS). I am writing today in support of TOTE Maritime ships being converted to LNG.

I am a Fisheries Biologist and own and operate Angling Unlimited, a charter fishing and lodge in Sitka, Alaska. I have been a resident of Washington State and the bulk of our fishing clientele is from the State. As someone who is on the water fishing well over 100 days a year, I believe it is very important that you consider the positive benefits LNG powered ships will have on the marine environment as opposed to diesel.

The data is clear. TOTE's use of LNG on their ships will:

- Reduce Sulphur Oxides by 100%
- Reduce Particulate Matter by 99%
- Reduce Nitrogen Oxides by 90%
- Your own SEIS documents show an overall reduction of greenhouse gases by 13.5%

Having TOTE ships moving from Tacoma to Alaska powered by LNG will reduce the negative impacts these ships currently have on Puget Sound and our coastal waters. It is imperative you recognize the fragile state of our Puget Sound and coastal ecosystem. Carbon, particulate matter and fossil fuels are contributors to ocean acidification which directly affects salmon and orca whale survival.

I would urge you to issue the necessary air permits for Tote's conversion to LNG. It is important to all of us from Tacoma, Washington to Sitka, Alaska.

Tom Ohaus

Tom Ohaus
Angling Unlimited
4256 Halibut Point RD
Sitka, AK 99835

1652-1 22. General Opposition
1652-2 5. Regulatory Framework

From: Deb Olsen
To: Public Comment
Subject: Puget Sound Energy - LNG facility Tacoma
Date: Wednesday, November 21, 2018 9:27:02 AM

Dear Friends –

I would like to comment on the draft SEIS for PSE's proposed LNG facility on the Tacoma Tideflats.

I am a lifelong resident of Tacoma. All four of my grandparents moved to the Tacoma area in the 1920s and 1940s. My dad was a WWII vet who worked in Tacoma, including on the Tideflats all his life.
My children were born in Tacoma, attended Tacoma Public Schools and now live and work in Tacoma. My husband and I run a nonprofit business in Tacoma that employs seven people, which is located in a historic building that we bought and restored in the 1970s.

I strongly request that the PSCAA reject the SEIS and start over. The current draft has been deemed totally flawed by a number of groups who are experts in the field of environmental quality and scientific research, such as the Sierra Club, Sightline Institute, 350 Tacoma, Redefine Tacoma and others. I support their statements. Due to the dire predictions about the rapid advance of climate change, no responsible government body can afford to make decisions based on outdated data.

I am concerned about the lack of consultation with the Puyallup Tribe and support the statements of the Tribe and their members. We have seen time and time again how tribal people have been marginalized by the majority culture, industry, and government, and it is time to do better by the folks whose land and wealth we have exploited for our gain.

I am concerned that this plant is not needed but is being pushed by wealthy fossil fuel interests. If we remind ourselves of the mistakes of the past, jobs and economic growth are usually given as reason to ignore problems that will have lasting impact on the health of people and of the planet that we depend on for the air, water and soil that give us life. We can no longer afford to ignore the dangers inherent in fracking natural gas, whether or not it will affect our local air quality – someone's air quality will be affected, and it will contribute to climate change.

Jobs or healthy air is a false dichotomy that we no longer have to buy into. We can have clean air and a thriving economy and plenty of jobs with clean industries. We just have to make the right choices. We are depending on the PSCAA to make the right choice on behalf of all of us.

Regards,
Debra Olsen
8222 S Park Ave
Tacoma, WA 98408
253-472-8539

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2056-1 3. Outside of SEIS Scope

The sea level is rising. We are overdue for a major earthquake. The ocean is filling with plastic. It is killing the marine life – sea creatures and birds. Reliance on fossil fuel is unsustainable.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Arthur Olson	Email: nos1ogaec@yahoo.com
Address: 3426 W Lake Sammamish Pkwy NE Redmond WA 98052	Phone: 425 466 2858

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2101-1 3. Outside of SEIS Scope

All pipelines eventually leak. And when they do, they are hard to fix and gases escape and damage is done to the environment and all living things.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Arthur Olson	Email: noslogaeo@yahoo.com
Address: 3426 W Lake Sammamish Pkwy NE Red... 1 WA 98052	Phone: 425 466 2858

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2103-1 3. Outside of SEIS Scope

I have had a small garden in my back yard for 32 years. This year an insect has been eating my tomatoes and pole beans that I have never seen before. It is a southern green stink bug. The warming climate caused by fossil fuel usage including fracked gas is a cause. We need to move quickly to renewable energy sources.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Arthur Olson	Email: nosloqaeo@yahoo.com
Address: 3426 W Lake Sammamish Pkwy NE Redmond WA 98052	Phone: 425 466 2858

2058-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I feel the SEIS needs to assess the actual impact of total carbon from methanol stacks plus the "reduced" carbon dioxide from burning "cleaner gas." the total is actually equal to coal's carbon footprint. So are we really in just an expensive zero sum game?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: LYNNE OLSON	Email: lyntention@yahoo.com
Address: 3426 W LK SAMM PKWY NE	Phone: 425 885 6663

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2100-1 3. Outside of SEIS Scope

I am concerned about compromising our water quality with expansion of fracked gas refining and transport. There is contamination of the aquifer with extraction, storage of polluted wate water, and potential leaks during transport. We already have contaminated the oceans with plastic, and the end use of this LNG is to create more plastic. Please look at the big picture of contamination / pollution.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Lynne Olson	Email: Lyntention@yahoo.com
Address: 3426 W LK SAMM PKWY NE PLM WA 98	Phone: 425 802-9617

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2102-1 22. General Opposition

I am especially concerned about converting our resource rich pacific northwest into a fracked gas/ fossil fuel ~~to~~ hub. It would further the ongoing demise of our salmon & ~~Orr~~ Orca populations. They play a major role in our eco system, ~~&~~ our diet & our economy. We need to protect them & block detrimental expansion of fossil fuel ~~exp~~ use. My 8 year old grandson asked me to write to save salmon.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: LYNNE OLSON	Email: Lyntention@yahoo.com
Address: 3426 W LK SAMM PKWY NE OLYMPIA	Phone: 425 885 6663

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2104-1 14. LCA Inputs and Assumptions - Leakage/Slippage

For an accurate assessment, the SEIS needs to report on methand leaks from the fracking/gas extraction, as well as likely leaks and explosions when transported via pipeline, through public & private land congested urban areas and areas with increased risk of explosion.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: LYNNE OLSON	Email: Lyntention@yahoo.com
Address: 3426 W. LK SAMM PKWY NE PLAIN WA	Phone: 425 885 6663

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2105-1 11. LCA Inputs and Assumptions - General

The supplemental enviromental Impact statement needs to assess the more likely gas power plant operating at full capacity. To rely on data based on less than full capacity is unrealistic and misleading.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: LYNNE OLSON	Email: Lyntention@yahoo.com
Address: 3426 W LK SAMM PKWY NE OLYMPIA WA	Phone: 425 885 6663

0822-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
NOV 9 2018
Puget Sound
Clean Air Agency

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Alex Osborne

Address or email KingKong776@gmail.com

I'm all for the clean air project! we need to start taking action instead of just talking about it. To improve earth. to stop hurting the planet and lives. Lets start TODAY!! to do what we can do to Help improve the earth and lives in it!!

1890-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The project is using a totally dodgy and outdated global warming value for methane. How can we take this DSEIS seriously when it uses such outdated science! I don't want this stuff polluting my air!

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: CHRIS PALMER Email: CHRIS@350PDX.ORG

Address: 1023 NE WEBSTER ST, PORTLAND, OR 97211

By completing this comment card you agree to receive updates about the project.

2021-1 23. General Support

From: jason@everyactioncustom.com on behalf of Jason Palmer
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment - Support
Date: Saturday, October 27, 2018 5:43:32 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine need a place to store LNG. For the time being LNG is one of the most cost effective fuel sources.

I do urge the enforcement and strict compliance with safety regulations to make sure that the Environment is properly protected.

Sincerely,
Jason Palmer
Huntington, NY 11743
jason@palmer.net

1834-1 3. Outside of SEIS Scope

From: Libby Palmer
To: Public Comment
Subject: Tacoma LNG SEIS Project Public Comment
Date: Wednesday, October 31, 2018 11:38:13 AM

Libby Palmer
2336 Kuhn St
Port Townsend, WA 98368

October 31, 2018

Dear Carole J. Cenci,

The proposed LNG project is a dangerous step and should be stopped now, for many reasons. I will deal with one that may not have been mentioned by other writers.

I am the Chairperson of the Jefferson County Immigrant Rights Advocates, an organization that offers legal advice and family support for immigrants. We have ongoing contact with immigrants in the Northwest Detention Center in Tacoma, near the proposed project. Detainees have long suffered from degraded air quality, "living" in an area specifically limited to non-residential uses. Most detainees have resided there for months, some more than a year, especially as immigration courts are overwhelmed by demand.

We have visited and interviewed detainees who specifically mention the industrial gases they are exposed to and how their breathing has been compromised by those gases. Scientists have demonstrated that methane has a huge impact on the climate and that fracking allows more methane escapement than previously thought. Short term impacts of methane may be serious as long term impacts.

We suggest that these health impacts be considered in reaching a Denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Libby
Libby Palmer

1357-4 22. General Opposition
1357-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
1357-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1357-4 13. LCA Inputs and Assumptions - Natural Gas Source

From: Penny Palmer
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 11:51:10 AM

Name: Penny Palmer
Email: becpal@comcast.net
Address: 2153 Madison St -
Eugene, Oregon 97405

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. It is clear that fossil fuel usage is a huge contributor to our climate change that is damaging so many people and places. I am sure that if you consider issues that were not considered on the October 8th report, you will see that this project will only make this worse.
Please consider the following items"
1. The Global Warming Potential of methane.
2. The projected lifespan is far beyond the time we need to take action.
3. Leakage rates from Canadian natural gas are much worse than originally stated.

These are just a few of crucially important items needing review for this facility. Please take into consideration what is best for people and the atmosphere ... not just what big business wants.

Sincerely,

1814-1 22. General Opposition

From: Hoa Pantastico
To: Public Comment
Subject: Revise the draft SEIS
Date: Thursday, November 15, 2018 8:03:42 AM

Please revise the draft SEIS so that it is comprehensive (e.g., includes analysis such as explosion probability based on accurate wind data, missing data from PSE, etc.) and leverages updated science (e.g., 2016 GWP value).

If PSE builds a plant unlawfully without permits and disregards the safety of those living nearby, how can we expect them to follow the rules for safely operating their LNG infrastructure?

Hoa Pantastico

Steve: Thank you. Malcolm Russell? Wendy Pantoja?

Wendy: Good evening. My name is Wendy Pantoja. I'm a part of the detention center system. I am a social anthropologist, too.

[05:31:00] So, I would like to say I think that people know. So, it looks like people from Tacoma will be paying for the water who LNG will be using. And we think water is life. And this is our life. We would like to know why we have to pay for that facility they should be using. So, I would like to say also Cascade Falls is really close to Tacoma in the cascades. Cascade is really close to here. If fracking gas techniques move tectonic plates, it will tend to be a big disaster, tsunamis, earthquakes, and more. Leaking is dangerous. Salmon, our waters will die. Look to now **[inaudible] [05:31:47]**. **[Inaudible]** is polluted.

Tacoma's shamefully known by Tacoma aroma and pollutions because politicians make decisions who don't consult the people, who don't respect Mother Earth.

[05:32:04] And we don't want air emissions and more asthma. Tacoma has a horrible detention center. A week ago, there was a big fight in **[inaudible]**, and Tacoma Port was closing operations. The air was toxic. And all of the people here, many people from Tacoma and other places, have to breathe that toxic air. So, are there not monitors in the areas? And about jobs, people are coming from different places to Washington because they say there are better ways here. And that is because Washington people fight to do better. We fight. In other states, I don't know, but we fight. And we know our main business in LNG, and we know.

We live here. Business leaves when polluted place and leave workers and people die from pollution.

[05:33:04] Money is important, yes, but money is not life. Water is life. And it is our life. This land is from Puyallup Tribe. Please be respectful on our ancestral land of our brothers and sisters because, when you don't, Mother Earth will be making people pay with life. And water is life. Thank you.

2563-1 10. LCA Calculations
2563-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2563-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2563-4 19. LCA Inputs and Assumptions - End Use

From: Linda Paravagna
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 1:07:51 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for opening up the review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.

Climate change is real, except to a few deniers. Your IPCC review of the greenhouse gas impacts of the natural gas used in this project is important.

Scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

I am concerned that the draft SEIS is not complete. There are several sections that are missing data; so one can not accurately assess the quality of the report or understand how certain conclusions are reached.

Please complete the report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

There are several issues with the current draft report you issued on October 8th. There is a possibility that if these issues are given proper attention and addressed with best science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as presented:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane.

It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.

- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?

- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have.

According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new

customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.

- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Most leakage rates were self-reported by the fossil fuel industry based on models; recent measurements taken in the field have shown that leakage rates are worse.

- How can one guarantee that PSE is sourcing its gas from BC anyway?

Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.

- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Linda Paravagna
lparavag@gmail.com
270 Pickering Place
Walnut Creek, California 94598

2563-4 cont'd 19. LCA Inputs and Assumptions - End Use
2563-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2563-6 13. LCA Inputs and Assumptions - Natural Gas Source
2563-7 14. LCA Inputs and Assumptions - Leakage/Slippage

0363-1 22. General Opposition
0363-2 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

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Note: All comments received during the comment period become part of the public record.

Name Elisabeth Parker

Address or email iam elisabeth parker @gmail.com

I'm Elisabeth, a mom, member of the Wisible, & local resident.
Aside from all the urgent issues regarding health, climate safety, the environment, & tribal rights, LNG is a TERRIBLE investment. The American Geosciences Institute warns that we only have 86 years of natural gas left.

The cost to ratepayers alone is $133 million of the $310 million total, according to local expert Todd Hay. He spoke earlier & the details of his pros & cons analysis is on ToddHay.com.

That's $1,546,511.627906 million a YEAR before there's no gas left. And we - ratepayers - only get 7% for 15 years meanwhile, we're pitting clean energy against good jobs, but that's not how it works. We should have both. Sound like socialized risk & privatized profit? You betcha.

1344-1 22. General Opposition

From: Teresa Parker
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 7:43:06 PM

Name: Teresa Parker
Email: terryparker195@gmail.com
Address: 1821 Jefferson Street -
Eugene, Oregon 97402

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I am one of a growing number of concerned citizens that see this project as dangerous and damaging to our environment. We must reduce use of fossil fuels and utilize renewable energy sources to address climate impacts.

The SEIS does not show due diligence by relying on outdated formulas and understating the full effect of fracking. I refer to a recent report from The Pembina Institute.

CItation: Kniewasser, Maximilian and Brianne Riehl. Risks to Water and Public Health from Unconventional Gas in B.C. Pembina Institute, 2018.

The Pembina Institute
610–55 Water Street
Vancouver, BC
Canada V6B 1A1
Phone: 604-874-8558
Copies of this publication may be
downloaded from the Pembina Institute website,
www.pembina.org

Having been born in the Northwest and having spent time sailing and cruising these waters the threat to sea mammals, fisheries and ocean already under stress cannot be overstated. Please ensure that that there us a more rigorous review of the potential environmental impact of this project.

0712-1 23. General Support

RECEIVED
NOV 8 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

November 1, 2018

RE: Comments for PSCAA draft SEIS for the Puget Sound Energy LNG facility

To Puget Sound Clean Air Agency,

I am a Puget Sound Energy (PSE) employee and strongly support the proposed PSE LNG facility at the Port of Tacoma.

The environmental and health benefits of LNG are very important. LNG is a cleaner alternative to conventional fuels such as diesel. The PSCAA's Draft SEIS, published on October 8, 2018, confirms this. Switching to LNG reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%. This helps improve air quality and reduce health risks, while helping local employers like TOTE comply with new stricter low-sulfur emission standards.

I believe that the proposed PSE facility represents a very significant benefit to both the environment and financial health of Tacoma and the entire South Sound area and that TOTE's leadership in successfully converting to LNG will set a very positive example for other shipping companies.

I encourage PSCAA to move forward and approve the air quality permit(s) necessary for the facility's completion now that the agency has independently verified, through its own SEPA review, the project's environmental benefits and overall reduction in greenhouse gas emissions. I fully support this project and am confident it will provide great benefits to the residents and businesses of Pierce County and the Puget Sound region for years to come.

Thank you for your consideration.

Regards,

Robert C. Parker III
14030 19th Ave NE
Seattle, WA 98125

1551-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1551-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Bill & Polly Parson
To: Public Comment
Subject: comments on DEIS for Tacoma LNG plant
Date: Tuesday, November 6, 2018 6:06:36 PM

Dear Puget Sound Clean Air Agency:

Thank you for the opportunity to comment on the Draft EIS for Puget Sound Energy's proposed LNG plant in Tacoma.

Pertinent questions have been raised about whether the DEIS uses the most reliable current estimates of (1) the global warming potential (GWP) of methane relative to CO_2 and (2) the amount of methane leakage at natural-gas extraction sites. Upward revision of either or both of these parameters could significantly decrease the calculated benefits of constructing the LNG plant. We respectfully urge you to address these concerns.

William W. Parson and Frances C. Parson
6551 NE Windermere Rd
Seattle, WA 98105

pollyandbill@comcast.net

2537-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2537-2 14. LCA Inputs and Assumptions - Leakage/Slippage
2537-3 7. SEPA Alternatives
2537-4 7. SEPA Alternatives

From: carpart97405@everyactioncustom.com on behalf of Carolyn Partridge
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Saturday, October 27, 2018 3:17:53 PM

Dear Responsible Official,

Hello - I am an Oregon citizen writing to encourage the most comprehensive analysis of air quality issues for the Tacoma LNG terminal. The emissions from this project will add green house gasses to the atmosphere and therefore contribute to the overall heating of the planet. This affects me even though I don't live near Tacoma. Natural gas is methane which traps heat many times more efficiently than CO2. Natural gas inevitably leaks along the supply chain. If it leaks more than 3%, it is the equivalent of burning coal. Although it burns cleaner than coal and oil, it still emits carbon when it is burned and we are already seriously overbudget on atmospheric carbon. A huge majority of climate scientists say we must stop using fossil fuels altogether. In that case, and I believe the science, we should not be expanding the use of fossil fuels by building new infrastructure.
If it is in your purview, please explore and encourage renewable energy alternatives. We do not have a lot of time left to stop runaway climate change.
Thank you. Carolyn Partridge

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can

2537-4 cont'd 8. No Action Alternative

achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Carolyn Partridge
Eugene, OR 97405
carpart97405@yahoo.com

1490-1 22. General Opposition

From:	Clea Partridge
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Monday, October 29, 2018 6:56:02 PM

Name: Clea Partridge
Email: cleatree@gmail.com
Address: 1944 N Bryant St -
Portland, Oregon 97217

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

The Puyallup Tribe of Indians opposes the refinery. The location of the site is directly on top of their traditional tribal lands that are both culturally important and treaty-protected. The Tribe was not meaningfully consulted on the project as is a further requirement of a 1990 Land Claim Settlement.

This plan is NOT supported by the people that live in this region. Do NOT continue with the planned building of this project.

Thank you,
Clea Partridge

Carole: Thank you. Derek Patches?

Derek: Hi, thank you. My name is Derek Patches. I've been a Pierce County resident since I was discharged from the Army 20 years ago. I have a wife, two daughters. One of the reasons we decided to stay here is because of the beautiful environment we all get to enjoy. We are truly concerned about the health of our home and our families. This whole thing has been brought forth to be a cleaner fuel source for ships. It's going to help folks in the port clean up the pollutants down there and the surrounding communities. It's better for all workers really and families, in this area. We need to agree that it's a step in the right direction.

[01:55:02] The do nothing or no action approach is just that. We're just going to keep plodding along here, bickering back and forth, and getting nothing accomplished. So, I support the Clean Air Agency finalizing this review and issuing the permits to the LNG facility. And, hopefully, we can do so sooner than later. Thank you.

From: Derek Patches
To: Public Comment
Subject: Multiple public comments
Date: Wednesday, November 21, 2018 10:04:33 AM
Attachments: 20181120164043742.pdf

Please accept these comments on behalf of Ironworker apprentices.

Thank you

Derek Patches
Business Agent
Iron Workers Local 86
206.550.3049

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

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Name William E. Nutter

Address or email 11815 200th Ave. E. Bonney Lake, Wa. 98391

I am in Favor of the LNG Facility in Tacoma For many reasons. It is a win-win situation, jobs and cleaner air and water

Puget Sound Energy - LNG Facility Tacoma

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Name David Erukuenkpo

Address or email davideruenkpo@yahoo.com

The Citing of the new LNG plant in Tacoma Washington is a step in the right direction, We have Long over due for a cleaner energy not to mention the job creation it will bring to people and Community.

Puget Sound Energy - LNG Facility Tacoma

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Name Daniel Baer

Address or email dannybaer81e@Icloud.com

The LNG plant will provide jobs, cleaner air for port workers & surrounding communities. It will alleviate the need for ships to use bunker fuel thus creating a healthier environment for the marine life & population. I am in favor of the LNG facility

Puget Sound Energy - LNG Facility Tacoma

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Name Barry Bonville

Address or email Barry10@comcast.net

I believe that this LNG facility is the major step in the right way to cleaning up pollution in the Puget Sound. I support this project.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

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Name Kermit Reyes

Address or email marilynreyes204@yahoo.com

I agree with the puget sound energy it will us in the next generation.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

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Name Isai Maya

Address or email

I agree with LNG progect It's Moving forward to a cleaner air for our Comunity it's will be also Be providing Jobs For Many People.

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

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publiccomment@pscleanair.org

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Name Erik Silva-Hurtado

Address or email ErikMundo98@gmail.com

I think it is a good idea. We should go forward with this plan because this is going to help in the long term. I don't think ~~we~~ have nothing to lose but to help our community, will also help with Jobs.

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

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publiccomment@pscleanair.org

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Name Michael Cruz

Address or email mcruz360@gmail.com

I think its a good Idea to start making a difference and helping the enviroment its a step forward making earth healthy to live a long life for years to come

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

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Note: All comments received during the comment period become part of the public record.

Name Patrick Skinner

Address or email patrickskinner2018@icloud.com

I support LNG Facility because I feel that taking any step in the right direction is better than waiting and not moving forward at all.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

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Note: All comments received during the comment period become part of the public record.

Name Kyle Owens

Address or email gomoallday@gmail.com

I support the LNG Facility due to the step in the right direction to curb pollution. This facility is only just the beginning, but a step in the right direction is better than no step at all. Overall, this project will bring more good than bad to the surrounding community.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

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publiccomment@pscleanair.org

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Note: All comments received during the comment period become part of the public record.

Name JACK LAHER

Address or email JACKLAHGR86@GMAIL.COM

PLEASE FINALIZE THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT AND APPROVE THE PERMITS TO COMPLETE THE LNG FACILITY IN TACOMA. CHANGING FUEL IN SHIPS TO LNG WILL PROVIDE A CLEANER ENVIRONMENT AND WILL CREATE MORE JOBS IN OUR REGION. THANK YOU.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Donald Rogers

Address or email Donald.Rogers.nb@gmail.com

I support the use of LNG Due to the simple fact of health. The Pacific Northwest is known for it Fresh Clean Cascade Crisp air. If you would like to keep that a Clean environment For our families, Kids, Parents, and future Generations then support for this is needed. The LNG Facility is also Very beneficial for our economy and growth as a community. Not only creating jobs for our Workers but creating consistant Economical growth. We could set the example for the future and maybe others would follow our footsteps. So please approve the permits and construct, employ and produce this facility... our families need it. Thank you

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Name Brian Hartwiger

Address or email theyard@hotmail.com

Please finalize the draft environmental Impact Statement and aprove permits. This can make an immediate improvement in the safety for the workers in the LNG Facility Tacoma.

Puget Sound Energy - LNG Facility Tacoma

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Name Joe Qualley

Address or email joequalley@gmail.com

I believe in what the LNG project is for and believe that this project will provide more jobs, cleaner working conditions and a better environment overall. Please finalize the draft and approve the permits, thank you.

Puget Sound Energy - LNG Facility Tacoma

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Name Michael Langworthy

Address or email langworthy64@Gmail.com

The health ~~and~~ of not only the workers in the Port but the regular citizens in the area. By switching to LNG, its a ~~burning~~ cleaning ~~cleaning~~ burning fuel and its gonna boost our local Work force Economy. Global warming is a real thing and the best way to start eliminating the danger, is to start with one company and get the snowBall affect rolling. So please finalize the act and pass the bill, approve permits

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Name Denis Krishtal

Address or email Ironworkerdkrishtal@gmail.com

I am supporting the LNG Plant Please finalize Permits ect. We need more Jobs and clean air..

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Name Gray Jensen

Address or email Gray7315@MSN.com

Will create jobs and will increase air quality. I support it

Puget Sound Energy - LNG Facility Tacoma

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publiccomment@pscleanair.org

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Name ALEXANDER WILSON

Address or email [redacted]

I am in support of the LNG facility because it is a positive step towards a cleaner environment. making this step a priority will only increase the likelihood of more steps towards a cleaner planet in the future.

Puget Sound Energy - LNG Facility Tacoma

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Note: All comments received during the comment period become part of the public record.

Name Joseph Sawyer

Address or email Joe-Sawyer@hotmail.com

I support the LNG Plan because of the Clean air and more work opportunity's.

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

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publiccomment@pscleanair.org

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Note: All comments received during the comment period become part of the public record.

Name Nathan Baughman

Address or email nathan1810@comcast.net

This will make a healthier workplace for the workers in our port. It will also provide a cleaner way to fuel these ships. This seems to be a better option in more ways than one. Please finalize the draft so we can move forward with this project. Thank you for your consideration.

Puget Sound Energy - LNG Facility Tacoma

Draft Supplemental Environmental Impact Statement

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publiccomment@pscleanair.org

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Note: All comments received during the comment period become part of the public record.

Name DEREK PATCHES

Address or email DerekPatches3@gmail.com

el feel the switch from bunker fuel to LNG is not only better for the health of the workers in our port, but the Planet also. el fuel allowing TOTE to make the switch is a step in the right direction Please finalize the draft and issue permits to complete PSE LNG facility.

1311-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1311-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1311-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1311-4 13. LCA Inputs and Assumptions - Natural Gas Source
1311-5 3. Outside of SEIS Scope
1311-6 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Mary Paterson
To: Public Comment
Subject: Comment on Draft SEIS for Tacoma PSE LNG project
Date: Friday, November 2, 2018 9:47:41 PM
Attachments: EECT-61539-perspectives-on-air-emissions-of-methane-and-climatic-warmin_100815-2.pdf
184887-Article Text-196156-1-10-20150204-1.pdf

Dear Puget Sound Clean Air Agency;

I am writing to comment on one aspect of the Draft SEIS for Puget Sound Energy's proposed LNG plant in Tacoma. Thank you for your diligence in making this process fair, comprehensive, and truthful.

One of the most alarming mistakes in the draft SEIS is its use of a global warming potential (GWP) for fossil fuel gas (mostly methane, CH4) from the 2007 IPCC AR4 rather than the 2016 value derived by the same lead scientist who updated the GWP in 2013 with the IPCC AR5. Why did the authors of the draft SEIS use the outdated GWP value from the 2007 IPCC AR4?

Another alarming mistake in the draft SEIS is its use of a 100 year period for the GWP of gas (methane). 100 year periods are frequently used for carbon dioxide where a 100 year period is appropriate because CO2 stays in the atmosphere for centuries. Gas or methane (CH4), however, does not stay in the atmosphere for centuries. Instead, its warming potential for the 0-20 year period after it is emitted is 86 or 87 times more than the warming potential of CO2 in the same 20 year period. The next 0-20 years are crucial for our success or failure in stopping the emission of greenhouses gases into the atmosphere. Why did the authors of the draft SEIS for this project use a 100-year GWP scale rather than a 10 and 20 year scale additionally or instead of the 100-year scale? A 100 year measurement is not the appropriate measurement for this SEIS.

The SEIS needs to be revised using the 2016 GWP value of 96 for a 20 year period. If it is not so revised, it is clear that the intention of the draft SEIS is to avoid the truth of methane as a extremely harmful greenhouse gas. We need an SEIS that does not obfuscate but tells the truth clearly, honestly, directly.

Another area of grave concern in the draft SEIS is PSE's claim that all the gas piped into the plant at the Tacoma tideflats/Port of Tacoma will come from British Columbia. I don't know how PSE can gurantee the source of the gas over a period of several decades. But let us for the sake of this comment assume that all the gas will come from BC gas mines. One concern that many of us who oppose this project have is for the Missing and Murdered Indigenous Women, a phenomenon of violence that correlates the presence of "man camps" (predominantly men hired to dig and lay pipelines and work at extraction sites) with the disappearance and murder of First Nations and Native American Indian women. I do not know if Puget Sound Clean Air Agency can consider this violence in its decision-making regarding the Tacoma LNG project. But perhaps it is within the scope of PSCAA's evalulation to consider this examination of the potential impact -- cultural, health, climate change -- of unconventionally mined gas (i.e. shale gas, fracked gas) on the Fort Nelson First Nations people and their land and water in northeastern British Columbia. This study, its questions and findings, need to be part of the PSE Tacoma LNG SEIS.

Another alarming mistake that is made in the draft SEIS for the PSE LNG plant is in regard to

the data it offers for leakage of methane at extraction sites. It is increasingly evident that gas companies under-report methane emissions, either because they intentionally avoid accurate measurements or because they intentionally lie about what they measure. When independent scientists measure real emissions, what they find is alarming. Three cases in point are the Denver Basin, the Uinta Basin in Utah, and the Los Angeles basin. Looking at extraction sites alone (leaving aside for the moment the reality of leaks during pipeline transportation), these three geographic examples show leakage alarmingly above the 3% threshold that would make natural gas/methane as bad as coal in its impact as a greenhouse gas. In Denver, National Oceanic and Atmospheric Administration (NOAA) scientists measured an average of 4% leakage at extraction sites. In Utah, Picarro scientists measured an average of 11% leakage. And in LA, NOAA again measured an average of 17% methane leakage from oil and gas extraction sites. (My source for these figures is the same video report linked above, "Chasing Methane with Mark Bittman" from the New York Times.) What would truthful, accurate, up-to-date measurements of methane leakage at the British Columbia sites show? What would truthful, accurate, up-to-date measurements of methane leakage during transportation via pipelines and compressor stations show? The sources used in the current draft SEIS are not reliable; the SEIS must be revised to give us scientifically accurate information about methane leakage rates.

Finally, the draft SEIS needs to include citations from and a serious consideration of the work of Robert Howarth,Tony Ingraffeo, and others at the Cornell University Methane Project. These presentation slides (November 2017) evaluating the possible sources of increased methane in the atmosphere are a beginning (the graph on slide #2 shows that emissions of CO2, CH4, and black carbon must all be responded to if we are to succeed in keeping global warming under 2 degrees C). Another important reference is an article by Howarth available for download as a pdf in this link (please see graph, page 5).

Thank you for considering these comments. Your decision of whether to accept the draft SEIS or require revisions is of great importance, as you know.

Sincerely,
Mary Paterson
11532 Alton Ave NE
Seattle, WA 98125
206-271-0251

1311-6 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
1311-7 3. Outside of SEIS Scope

SHALE GAS DEVELOPMENT IN FORT NELSON FIRST NATION TERRITORY:

Potential Regional Impacts of the LNG Boom

KATHRYN H. GARVIE, LANA LOWE, AND KARENA SHAW*

OVER THE PAST DECADE, abundant "unconventional" gas reserves throughout North America have become economically and technically viable through the combined use of two extraction technologies – horizontal drilling and hydraulic fracturing (or "fracking") – and, as a result, production on the continent has boomed.[1] In 2012, the Government of British Columbia released a Natural Gas Strategy outlining its vision to dramatically increase provincial natural gas production and exports (BC Ministry of Energy and Mines 2012a). To escape the gas glut (and subsequent low prices) in North America, British Columbia is pursuing growing Asian markets. In order to be exported to Asia, the gas must be piped to the province's west coast, liquefied (i.e., turned into "liquefied natural gas" – LNG – at coastal plants), and then shipped in tankers across the Pacific Ocean. In the BC Jobs Plan (Government of BC 2011), the Liberal government committed to having three LNG plants up and running by 2020. The year 2014 will be pivotal in British Columbia's energy history as a number of proponents working towards a 2020 opening decide on final investments (Government of BC n.d.).

It is widely accepted that at most only a few of the more than twelve proposed LNG plants will ever be built. Even so, independent researchers have raised concerns about the potential implications of these developments for British Columbia's efforts to reduce greenhouse gas (GHG) emissions (Jaccard and Griffin 2010; Stephenson, Doukas, and Shaw

* This research was funded by Carbon Management Canada, Project D215, and a SSHRC Master's Fellowship. The authors would like to express their thanks to Roberto Concepcion, Trevor Lantz, Ellie Stephenson, Joanna Reid, Graeme Wynn, and three anonymous reviewers for their thoughtful assistance with this article.

[1] Hydraulic fracturing injects large volumes of water mixed with sand and chemicals underground at high pressures to create fissures in the rock, allowing the trapped gas to flow into the well.

2012). What is less widely appreciated – and has not been adequately researched or assessed – is the issue of the upstream environmental impacts of the LNG industry (Council of Canadian Academies 2014). In British Columbia, the expansion of natural gas production for LNG exports means the development of unconventional gas reserves. For example, between 2005 and 2010, the percentage of wells in the Horn River Basin targeting shale gas jumped from 3.4 to 85.4 percent of all new wells drilled (BC Oil and Gas Commission 2010). Under the current environmental assessment regime, only those impacts associated with pipelines and gas processing plants are systematically assessed. However, First Nations in the shale gas plays that will feed the LNG industry are already experiencing a much wider range of effects. One of the nations most directly affected is the Fort Nelson First Nation (FNFN), whose territory includes three of the four major shale gas plays in British Columbia.[2]

This research, conducted with the Fort Nelson First Nation Lands Department, was prompted by concerns that the province has not meaningfully assessed the risks and impacts of an unconventional gas industry in FNFN territory. Nor is there adequate data or resources available for the nation to assess the risks on its own. In what follows, we tell the story of the rapid expansion of natural gas developments in the FNFN's territory through figures developed by the FNFN Lands Department. These figures reveal a race for industrial tenure, landscape disturbance on a massive scale, threats to wildlife, risks to water quality and quantity, and a high level of GHG emissions. After a short description of the treaty rights and land uses of the FNFN and the policy context of the BC natural gas industry, we present and describe these impact-related figures in turn, also referring to a wider literature on natural gas development in British Columbia and elsewhere. We aim to illustrate the scale and pace of industrial expansion and to identify a range of associated impacts. This investigation of potential impacts reveals an urgent need for a strategic assessment of the cumulative upstream effects of the LNG industry. Appeals for baseline studies and cumulative environmental assessments of the oil and gas industry in northeast British Columbia are widespread, coming from First Nations, researchers, and non-governmental organizations alike (West Coast Environmental

[2] The four major shale gas plays in British Columbia are the Liard Basin, the Horn River Basin, the Cordova Embayment, and the Montney Trend. The first three fall almost entirely within FNFN territory (see Figure 1); the majority of the Montney shale gas play, however, lies farther south. In this article, we focus largely on the plays within FNFN territory but also draw, where relevant, from research regarding shale gas developments in the Montney Trend.

Law 2004; Parfitt 2011; Campbell and Horne 2011; University of Victoria Environmental Law Centre 2013; Gale and Lowe 2013; Garvie and Shaw 2014 (this issue). Assessing, understanding, and mitigating cumulative effects is an essential precondition to the LNG industry proceeding in a way that protects the ecological and social resilience of the region, including the constitutionally protected treaty rights of the Treaty 8 First Nations on whose territory this development will proceed. An informed understanding of cumulative effects, in turn, should be the basis for any decision making around how the industry develops.

CRITICAL CONTEXT

Fort Nelson First Nation

The Fort Nelson First Nation is made up of fourteen extended families, whose traditional languages are Dene and Cree. The FNFN territories cover approximately seventy-two thousand square kilometres of northeast British Columbia. Since time immemorial, FNFN ancestors have lived and travelled throughout their traditional territories on seasonal rounds to hunt, fish, trap, and gather. Family groups travelled on their individual seasonal rounds between villages, fishing and hunting camps, and traplines by riverboat, dogteam, horseback, and foot. Families were dispersed among ten different village sites before moving to the main reserve six kilometres south of the town of Fort Nelson in the 1960s. Members of the FNFN continue to visit the village sites and actively hunt and trap in their family hunting grounds, but recent shale gas developments are making it increasingly difficult to do so. The FNFN's territory contains three large shale gas basins – the Liard Basin, the Horn River Basin, and the Cordova Embayment (see Figure 1) – within which extraction-related activities have rapidly expanded over the last ten years.

The FNFN has shared its territories with settlers and their industries for decades. Some families have supplemented their incomes by working with local guide outfitters and prospectors as well as in forestry and oil and gas extraction. The conventional oil and gas industry has been operating within FNFN territory since the 1940s, but the rise of unconventional gas has ushered in a new era of development. This shale gas era is placing immense pressure on existing regulation, and provincial oil and gas governance structures, to evolve with the changing character of the industry and to address novel environmental concerns (Stefik and Paulson 2010).

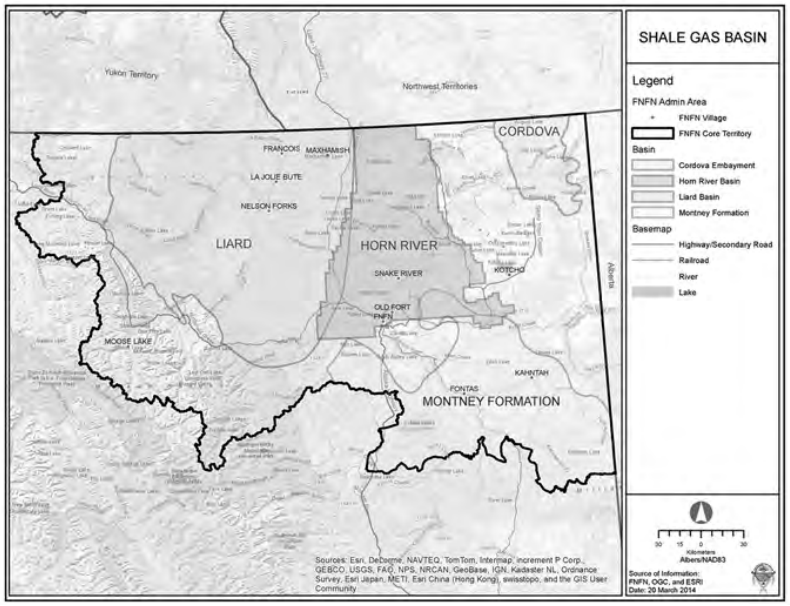


Figure 1. Shale gas basins in Fort Nelson First Nation's territory. *Source*: Fort Nelson First Nation Lands Department.

The FNFN understands its relationship to the Crown through Treaty 8. When the FNFN signed on to Treaty 8 in 1910, it agreed to share the land on the condition "that the treaty would not lead to any forced interference with their mode of life"; this included the right to "be as free to hunt and fish after the treaty as they would be if they had never entered into it" (Laird, Ross, and McKenna 1899). As unconventional gas development accelerates, the FNFN is concerned that these rights are not being respected and protected by government regulators (see Garvie and Shaw 2014). This concern was highlighted on 16 April 2014 when the province made the decision to exempt sweet gas plants from environmental assessment requirements without consulting with First Nations. After a quick and united response from BC First Nations, the province retracted the decision within twenty-four hours (CBC News 2014; Prystupa 2014). There is a growing demand from First Nations for collaborative, culturally and scientifically sound research to be gathered prior to any decisions being made on the future of the BC LNG industry (Garvie and Shaw 2014). As the FNFN chief Sharleen Gale and lands director Lana Lowe explain in a *Globe and Mail* opinion piece: "To truly have peace, we as a people must be able to share the wealth and protect

the integrity of our land. We need new mechanisms for decision-making and both the industry and government must be willing to change their ways" (Gale and Lowe 2013). Imminent decisions on how British Columbia's LNG and shale gas industries advance have the potential to strongly influence the province's relationship with First Nations.

The Rush for Tenure

Shale gas development is different from the conventional oil and gas development that has been occurring in FNFN territory since the 1940s in at least two ways: (1) it is happening at an increased pace and scale and (2) the use of hydraulic fracturing introduces new environmental concerns, especially regarding water. The sudden economic viability of shale gas extraction in North America due to a combination of new technologies and higher natural gas prices created a tenure buying frenzy in northern British Columbia between approximately 2005 and 2010. By the time FNFN members heard about shale gas and fracking at a town hall meeting hosted by an industry proponent in 2008, petroleum and natural gas tenure sales had already peaked in the Horn River Basin at $1.1 billion (C. Adams 2011). Oil and gas company Devon Canada set a provincial record in August 2008 for the largest single bonus paid at a petroleum and natural gas rights disposition when it purchased a 5,789-hectare drilling licence in the Horn River Basin for $75.8 million. By 2010, industry had bought up tenures covering over 75 percent of the Horn River Basin and had moved on to the Liard Basin, spending $47 million and $110 million on tenures in 2009 and 2010, respectively (ibid.). Despite lower natural gas prices, prolific production rates at test wells in the Liard are still anticipated to offset the higher production costs in the remote northeast area (Apache 2012). According to the Northern Rockies Regional Municipality (n.d.), at the end of 2012, the provincial government had accrued more than $3.6 billion from land sales and royalties in the Horn River Basin and the Liard Basin. Figure 2 compares tenure holdings in FNFN territory in 2006 and 2013. The FNFN was not consulted on petroleum and natural gas tenure sales until June 2012, despite the implications of these sales for the future of FNFN territory and the ability to practice constitutionally protected treaty rights.

The tenure rush in British Columbia was followed by a relative lull in development as the economic recession slowed American markets and they became saturated with domestic shale gas, which was also being rapidly developed. US gas prices have remained below six dollars per million British thermal units (mmBtu) since 2009, after a 2008 peak of

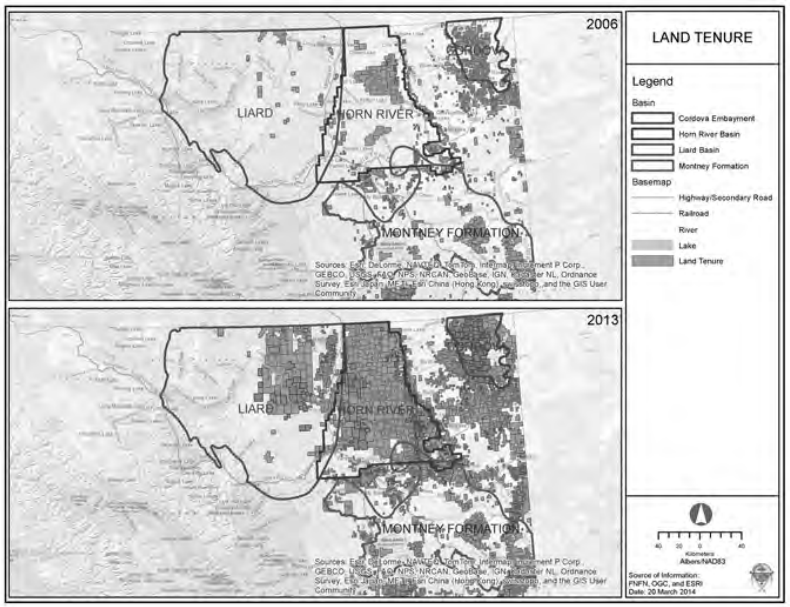


Figure 2. Petroleum and natural gas tenures in FNFN territory in 2006 and 2013. *Source*: Fort Nelson First Nation Lands Department.

more than thirteen dollars (Nasdaq n.d.). As a consequence, there is ongoing restructuring in the industry (Jang 2014; Lewis 2014; Penner 2014). For example, Devon Canada is looking to sell off its assets in the Horn River Basin, which it set records purchasing just six years ago (Cattaneo 2013). However, other companies are investing for the long haul, building processing facilities and pipelines and conducting seismic exploration while they wait for better markets (e.g., Apache n.d.; Quicksilver Resources Inc. n.d.).[3]

While industry is preparing for the coming LNG boom, the provincial government appears less than motivated to develop governance and regulatory frameworks that will protect environmental and social conditions upstream (CBC News 2014; CCA 2014). The FNFN Lands Department

[3] One study into the long-term viability of the BC LNG industry cited research from other jurisdictions that shows that production rates at individual shale gas wells have been found to drop significantly after the first couple of years (Hughes 2014). It is unknown whether this kind of drop in well productivity is affecting the industry restructuring in British Columbia's northeast because well depletion rates are not publicly available. However, based on shale gas well production rates elsewhere, David Hughes (2014) predicts that industry will require continual well development in the northeast to maintain production rates over time, resulting in fifty thousand new wells by 2040.

is working to fill this critical gap, but, as stated previously, there are currently no regulatory requirements for industry to carry out baseline studies on its tenures. Without this information, the scope and scale of development impacts on First Nations territories and cultural practices cannot be fully understood as development progresses (Tollefson and Wipond 1998; Booth and Skelton 2011).

Once tenure has been acquired, all development – with the exception of projects that trigger an environmental assessment (i.e., pipelines and gas processing plants) – must be approved through the Oil and Gas Commission's permitting process.[4] As explained in Garvie and Shaw 2014, approval of developments proceeds on an individual, permit-by-permit basis. No long-term, landscape-scale plans are made available to the public or affected parties such as the FNFN.[5] As a consequence, assembling a landscape-scale picture of present impacts, let alone potential future impacts, requires mapping hundreds of different permits individually. The FNFN's Lands Department is currently undertaking this work. In what follows, we document the scale of development that has taken place to date on the tenures purchased in FNFN territory and explore some of the potential impacts of this development.

The Development Footprint

Figure 3 displays the cumulative oil and gas activities in the FNFN's traditional territories as of March 2014. The solid patches are grids of seismic lines one to three metres in width, occurring approximately every 240 metres across the landscape. If all of the linear disturbance in the Liard, Horn River, and Cordova basins were laid end to end, it would wrap almost two times around the planet. In the most heavily affected areas of the FNFN's territory, there are over 9.98 kilometres of linear disturbance per square kilometre.

Figure 4 illustrates what this level of disturbance looks like at Two Island Lake, an area of particular cultural importance to the FNFN (FNFN 2012a). A number of families continue to hunt, fish, trap, and gather in the area, despite industry's extensive impacts on the landscape. Within the 100-square-kilometre area represented in Figure 4, there are 90 wells, 25 pipeline right-of-ways, 7 processing facilities, 114 water withdrawal points, and 2,385 kilometres of seismic lines. As of March 2014, there

[4] For more information on responsibilities of the BC OGC, see https://www.bcogc.ca/about-us.

[5] This lack of long-term, landscape-scale oversight is in contrast to industries with similar landscape-scale impacts such as forestry, where companies must have a Forest Stewardship Plan approved for their licence area before submitting site-specific permit applications (Forest and Range Practices Act SBC 2002 c. 69).

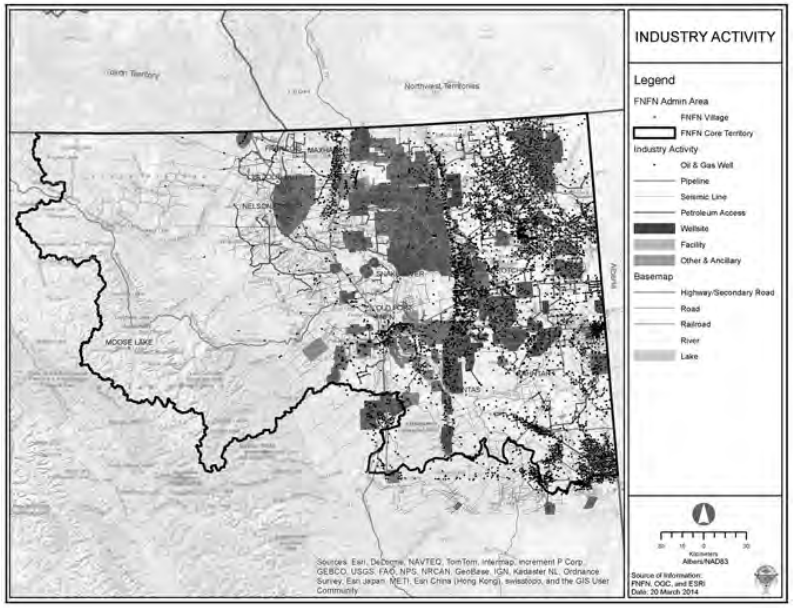


Figure 3. All oil and gas activity in FNFN territory as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

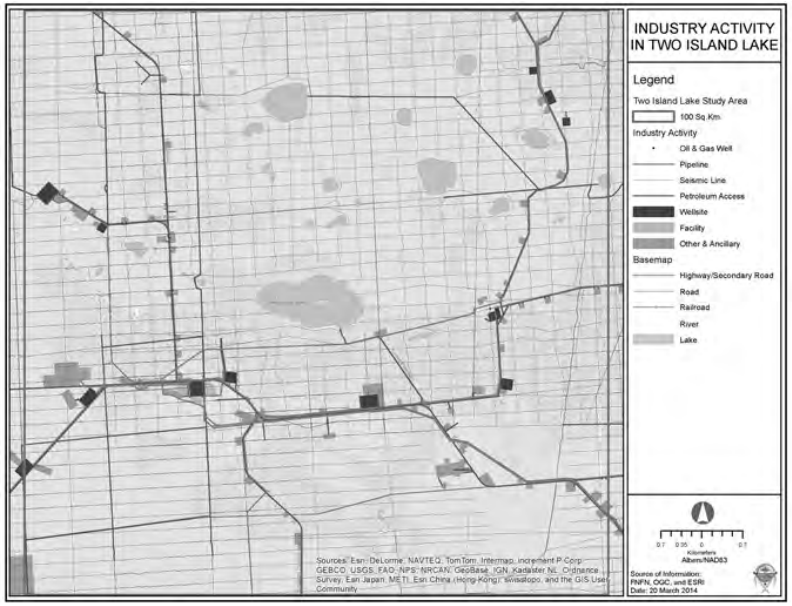


Figure 4. All oil and gas activity in a one-hundred-square-kilometre area around Two Island Lake as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

has been no systematic assessment of the cumulative impacts of these developments on the wildlife and ecosystems of the northeast.

The pace and scale of development depicted in these figures have a wide array of potential impacts on the region that go almost entirely unstudied. In the following sections, we discuss the potential risks to wildlife, water, air, and human health based on northeast British Columbia's unique environmental and social characteristics and research conducted in other jurisdictions where shale gas development is taking place.

POTENTIAL IMPACTS

Threats to Wildlife

The development footprint in FNFN territory displayed in Figure 3 and Figure 4 also undeniably tells a story of changing wildlife habitat in northeast British Columbia. The impacts these changes are having on wildlife are unknown since the necessary research has not been conducted. Potential impacts, however, can be extrapolated not only from a number of studies on wildlife experiencing comparable levels of habitat disturbance from other industries but also from studies on livestock living in close proximity to conventional and unconventional oil and gas operations in other places. The threats to wildlife fall into two categories: (1) spatial changes to habitat (which alter predator-prey and wildlife-human interactions) and (2) degradation of habitat (which has impacts on wildlife health).

One of the few species that has been extensively researched in the northeast is the boreal woodland caribou; we use it here as an example of how the industrial footprint of unconventional gas development can have a variety of far-reaching effects on wildlife. The boreal woodland caribou appears on both provincial and federal "red lists" of endangered species. The FNFN territory contains five of the six boreal woodland caribou populations in the northeast. A 2009 government report identified oil and gas exploration as the greatest risk to northeast caribou populations (Goddard 2009). Seismic lines and roadways have been found to alter predator-prey relationships, resulting in increased caribou mortalities and decreasing populations (James and Stuart-Smith 2000; Latham et al. 2011). Additionally, noise and lighting from roadways, processing facilities, and well sites deter wildlife and alter habitat ranges (Dyer et al. 2001; Sorensen et al. 2008). Twelve of the fifteen core caribou habitat areas in northeast British Columbia have surpassed the

61 percent anthropogenic impact threshold (Theissen 2009), at which point a population becomes unsustainable (Sorensen et al. 2008). The preservation of remaining caribou habitat in the northeast is critical.

Similar studies have not been conducted on culturally significant species to the FNFN such as moose and beaver. However, it is well known that habitat fragmentation and degradation is associated with significant species loss (Fahrig 2003). Baseline studies are critical in order to determine how much development can take place before species loss begins. In the Peace-Moberly region of the northeast (south of FNFN territory) it is already too late: a study conducted in 2008 found that the cumulative effects of landscape change from industrial development (namely, conventional oil and gas development, mining, forestry, and agriculture) are synergistic, additive, and antagonistic in nature, and have reached a point at which they are threatening the ecological integrity of the area as a whole (Nitschke 2008). The alarming results of this study highlight the need for better industry regulation in FNFN territory to ensure that this region does not suffer the same fate.

Degraded habitats threaten wildlife health in numerous ways. If the land and waterways become contaminated, so, too, will the animals that are sustained by them. Studies have not been conducted in the northeast, but there are first-hand accounts from hunters about increasing rates of sick animals with tumours and failing organs. Outside British Columbia, where much shale gas development is occurring in more populated areas, the majority of research on fracking and animal health concerns livestock. In the United States, proximity to shale gas developments and exposure to frack fluids has been found to cause negative health effects in livestock, including increased mortality (Bamberger and Oswald 2012). In a 2014 article, Bamberger and Oswald draw connections between livestock health close to drilling operations and food safety in the United States. Additionally, studies conducted in conventional oil and gas fields in Alberta have found decreased fertility in cattle and increased calf mortality rates due to air pollution (Waldner 2008). In the BC context, these kinds of risks could have serious health implications for wildlife as well as for community members hunting and trapping these animals.

Northeast British Columbia is one of the few remaining places on earth that still has boreal forest able to support a wide array of large mammals, including grizzly bears, American black bears, wood bison, bighorn sheep, moose, caribou, and wolves (Laliberte and Ripple 2004). The forests, muskeg, and lakes of FNFN territory are home to over thirty endangered or vulnerable species, including woodland boreal caribou, wood bison, grizzly bear, wolverine, and fisher, as well as a number

of culturally significant species, such as freshwater whitefish and bull trout (BC Ministry of Environment n.d.). Members of the FNFN are already speaking out about changes to the landscape and the health and behaviour of the animals, but without baseline data and ongoing monitoring, provincial regulators and industry representatives often reject community members' concerns as anecdotal. Allowing an information and data vacuum to persist in northeast British Columbia facilitates uninformed industry growth and the marginalization of FNFN concerns.

Water Use and Contamination

Concerns about water use and contamination arise virtually everywhere the shale gas industry has expanded (Freyman 2014; International Energy Agency 2012), and northeast British Columbia is no exception (Parfitt 2011; Campbell and Horne 2011). Until recently, to support the rapid development of the industry, almost all water use has been facilitated by "Section 8" water permits. Section 8 water permits are for short-term water use access and are issued by the Oil and Gas Commission (OGC) according to section 8 of the BC Water Act. As of 2011, water permits are required for surface water removal from any surface water body, including borrow pits (a human-made pit created during the removal of construction materials). Up until April 2014, British Columbia was the only Canadian province that did not regulate groundwater use.[6] Figure 5 displays all of the surface water diversion points approved under section 8 water permits in FNFN territory as of March 2014. These permits only represent a small fraction of water that would be required should LNG move forward at the pace anticipated by the provincial government.

In the shale gas industry water is primarily used for hydraulic fracturing. The amount of water required to frack a well varies dramatically, depending on the local geography. A report for the BC Ministry of Energy and Mines (MEM) found that, on average, 34,911 cubic metres of water are used per well in the Horn River Basin, while just 1,925 cubic metres are used per well in the Montney Trend (Johnson and Johnson 2012).[7] Apache holds the record for the world's largest frack job at a pad

[6] As of 29 April 2014, there is a new Water Sustainability Act in British Columbia. Of particular note is the introduction of groundwater regulation and environmental flow requirements. See Curran (2014) for a summary of the new legislation.

[7] A BC OGC factsheet documents much higher averages: 77,000 cubic metres per well in the Horn River Basin and 7,000 to 10,000 cubic metres per well in the Montney Trend (BC OGC 2014b). The discrepancy between these two sets of numbers – which both come from official provincial documents – reveals the ongoing uncertainty of data regarding water use for hydraulic fracturing in British Columbia.

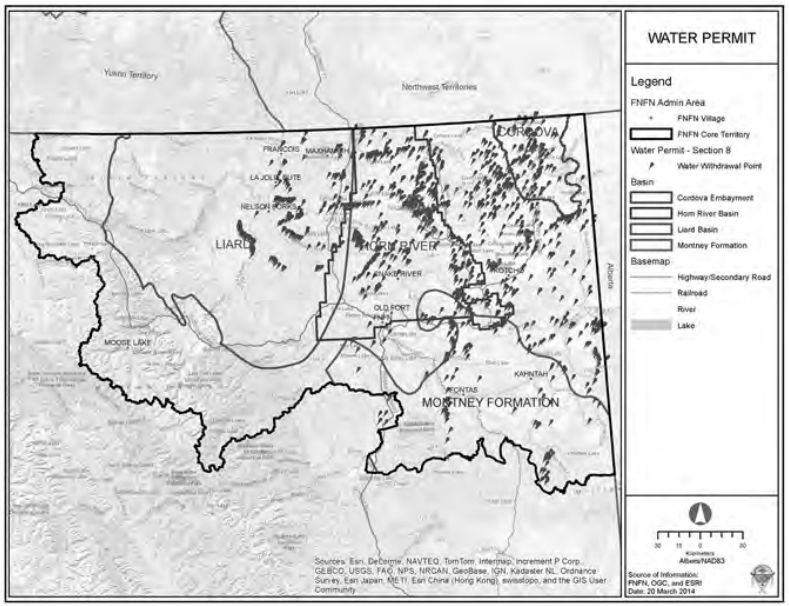


Figure 5. All of the water diversion points approved in FNFN territory through OGC-issued section 8 water permits as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

with sixteen wells near Two Island Lake. It took 111 days to frack the sixteen wells a total of 274 times. In total, 980,420 cubic metres of water and 50,000 tons of sand were used during the operation (C. Adams 2011; Parfitt 2011). That volume of water is equivalent to 392 Olympic swimming pools' worth. Due to contamination, once water is used for fracking, it must be forever removed from the hydrologic cycle; in the absence of treatment facilities in the northeast, companies fulfill regulatory requirements by disposing of flowback in deep-injection wells.[8]

The vast majority of water being used by industry for fracking is surface water; just 7 percent comes from source wells, despite the fact that saline aquifers have been found beneath large areas of tenure (BC Oil and Gas Commission 2014a). While some companies are taking advantage of these sources, there are no regulatory requirements that ensure that non-potable sources are prioritized and that water recycling is carried out.

As the industry is becoming established, companies are moving towards long-term water licences. Nineteen water licences in the FNFN's

[8] Flowback is a highly saline, toxic solution containing both the frack fluid chemicals injected into the well during the fracking operation and naturally occurring toxins from within the shale formation, such as radioactive barium and arsenic (Vengosh et al. 2014).

territories are currently awaiting government approval. The first licence granted has resulted in a lawsuit by the FNFN alleging inadequate consultation in the granting of the licence and significant flaws in the licence itself, particularly in terms of the lack of regulatory oversight. The FNFN had experience with this lack of government oversight and enforcement when, in the summer of 2012, during a one-in-thirty-year drought, 182,785 cubic metres of water were removed from North Tsea Lake after the lake's discharge dropped below the zero withdrawal limit (Chapman 2013). The use of multi-well pads (such as the one at North Tsea Lake) increases the intensity of water demand over short periods of time (Rivard et al. 2014). The impacts of these withdrawals on the surrounding ecosystem will never be fully understood because no baseline data exist. There continues to be no systematic monitoring of impacts, despite the unprecedented scale of withdrawals relative to the water body's size allowed under the licence.

The OGC is working reactively to fill the regulatory gaps created by the widespread introduction of hydraulic fracturing, which has brought with it unique governance challenges, including water use and contamination (Stefik and Paulson 2010). In a recent effort to deal with increased water use by the oil and gas industry, the OGC has developed a publicly available NorthEast Water Tool (NEWT) that assesses water availability based on estimates of monthly and annual water flows and existing water permits and licences. It is used as a "decision-support tool" for short-term water permits and long-term water licences (BC Oil and Gas Commission n.d.). Environmental flow needs are also estimated; however, considering the limited baseline data for the region the accuracy of these estimates is questionable. The longer the OGC waits before implementing rigorous data collection the less useful the information will be because ecosystems will already be in an altered state.

Water acquisition is only part of the controversy surrounding hydraulic fracturing; water contamination is also a significant concern. According to the US Environmental Protection Agency (EPA) (2012), there are five stages in the hydraulic fracturing water cycle that could lead to groundwater contamination: (1) water acquisition, (2) chemical mixing, (3) well injection, (4) flowback and produced water, and (5) waste water treatment and waste disposal. The real contamination effects of these five stages remain largely unknown. Whether or not hydraulic fracturing is responsible for drinking water well contamination in a number of jurisdictions across the United States is highly contested; a lack of pre-drilling data makes it difficult to identify fracking as the

sole potential cause of contamination (Vidic et al. 2013), but there are a number of studies that have found a correlation between a drinking well's proximity to a shale gas well and contaminants in the water. For example, Fontenot et al. (2013) found that wells within three kilometres of active gas wells in the Bennett Shale had higher levels of arsenic, selenium, strontium, and total dissolved solids. In the Marcellus Shale in the Appalachian Basin, household wells less than one kilometre from gas wells had concentrations six times higher of methane and concentrations twenty-three times higher of ethane (Jackson et al. 2013).

In 2013, the US EPA backed away from finishing an independent, peer-reviewed study on contaminated wells in Pavillion, Wyoming, after releasing a draft report linking the contamination to fracking in the area (Vidic et al. 2013). The EPA passed the study off to the state of Wyoming in June of that year. The state will be working with Encana, a company with operations in the region, to complete the research (Office of Governor Matt Mead 2013). This sequence of events raises alarms for a number of reasons, not least of which is industry's involvement in research in which it has a strong vested interest. Water studies currently being conducted in FNFN territory are also industry funded. The BC government has installed six groundwater monitoring wells in the Montney Play but has yet to install a test well in the Horn River Basin (Rivard et al. 2014).

The shale gas reservoirs in northeast British Columbia lie at much greater depths than do the deposits in the United States, where groundwater contamination has been reported. However, there are still potential pathways through which contaminants could travel to water bodies. In 2012, the BC OGC completed a study that found that seismic events in "the Horn River Basin between 2009 and 2011 were caused by fluid injection during hydraulic fracturing in proximity to pre-existing faults" (BC Oil and Gas Commission 2012). The seismic events studied did not result in any wellbore deformation on vertical well sections (ibid.), but seismicity may be a risk to well casings over time, creating vertical fluid and gas migration pathways. Unlike other provinces, British Columbia does not require well casing integrity tests prior to fracking (Rivard et al. 2014). While integrity tests are required for deep injection wells, a report released by the University of Victoria Environmental Law Centre still raises concerns about the potential for compromised well casings, especially considering that 60 percent of the oil and gas industry's

waste (including flowback and produced water) has been injected into wells that are more than forty-three years old (Carr-Wilson 2014).[9]

Researchers have also raised concerns over fracking's effect on the speed of advective transport rates. Myers (2012) found that advective transport rates of contaminants up into aquifers are dramatically increased after hydraulic fracturing; modelling of the Marcellus Shale indicates that contaminant transport that naturally takes up to tens of thousands of years may only take tens or hundreds of years after hydraulic fracturing occurs (ibid.). Independent hydrologists in British Columbia have also raised concerns about advective transport and compromised well casings over time, but supporting research has not yet been conducted.

In addition to the potential for groundwater contamination during fracking or disposal, there is also the potential for surface water contamination from spills and the improper treatment, storage, and disposal of frack fluids and flowback. Less rigorous regulatory standards for disposal and storage in some states have resulted in numerous incidences of aquatic species death in rivers (Vengosh et al. 2014) and livestock mortality (Bamberger and Oswald 2014). A study of forest health after direct exposure to frack fluids in West Virginia resulted in 56 percent tree mortality within two years (M.B. Adams 2011; see also Warner et al. 2013). Other threats to surface water and surrounding ecosystems include increased sedimentation from road and pipeline development and elevated traffic levels (Entrekin et al. 2011).

In sum, even at current levels of development, industry demand for water has been significant and poorly regulated. Even with massive recent increases in shale gas development, there is currently no independent, publicly available assessment of the implications of water use at this scale or of the dangers of contamination in the northeast.

Air Quality and GHG Emissions

The emissions from shale gas developments are also drastically underresearched: preliminary analyses of the impacts on local air quality and global GHG emissions have shown cause for concern and the need for extensive and more comprehensive studies. Recent and preliminary work in northeast British Columbia has shown that shale gas development may affect local air quality in ways that have impacts on human health. In June 2012, the Fraser Basin Council released Phase One of a human

[9] See the University of Victoria Environmental Law Centre's report *Improving the Regulation of Fracking Wastewater Disposal in BC* for a list of fifteen recommendations to improve the safety of deep-injection wells in the oil and gas industry (Carr-Wilson 2014).

health risk assessment currently under way: *Identifying Health Concerns Relating to Oil and Gas Development in Northeast BC*. The BC Ministry of Health contracted the report after public concerns about oil and gas development began to grow with the industry's rapidly increasing activity (Fraser Basin Council 2012). The report documents numerous environmental pathways created by the oil and gas industry that could result in adverse human health effects: inhalation of "sour gas" (gas with a high hydrogen sulphide content), inhalation or ingestion of diesel dust from increased traffic and operating equipment, and the ingestion of contaminated wildlife and water (ibid., 25). Phase Two of the study is due later this year. Based on some of the concerns raised during Phase One, the Ministry of Health provided two additional air-monitoring sites in the South Peace (BC Ministry of Health 2012). In FNFN territory, however, there continue to be no provincial monitoring stations, despite rapid industrial growth in the Horn River Basin. Without air quality data, community concerns about risks to long-term health and ecological well-being remain unexplained and unaccounted for in scientific research and policy. This information gap raises serious concerns, particularly given what is known about the massive production of contaminants by the upstream oil and gas sector in Canada as a whole: in 2006, the sector accounted for 17 percent of sulphur oxide, 21 percent of nitrogen oxide, and 28 percent of volatile organic compounds in the country (Environment Canada 2013).

Numerous studies in the United States have linked air quality during well completion to human health effects. McKenzie et al. (2012) found that individuals living within 0.8 kilometres of a gas well completion are at a greater risk of contracting cancer from elevated benzene levels and that they also experience other subchronic health effects. An air quality study in Colorado conducted at wells during the initial drilling phase found non-methane hydrocarbons at levels beyond those that have been found to cause lower IQ scores in prenatally exposed children (Colborn et al. 2014). Adgate, Goldstein, and McKenzie (2014) argue that the research on populations living near unconventional gas developments has been scientifically limited in a number of ways (e.g., self-selected populations, small sample sizes, lack of consistently collected data) and that more substantive research on risks to human health risk assessments is needed.

The FNFN often hears the argument that local sacrifices will result in net benefits for the planet through reduced GHG emissions. In the fall of 2013, Premier Christy Clark declared that by developing shale

gas and LNG "we are doing the world a favour" (Canadian Press 2013). Not only is this ethically dubious, its validity has been questioned by several researchers. A number of studies indicate that emissions from shale gas over its full lifecycle are significantly higher than are the emissions from conventional gas (Jiang et al. 2011; Karion et al. 2013), and they are possibly as high as coal if carbon capture and storage (CCS) technologies and fugitive emission reduction measures are not adopted (Howarth, Santoro, and Ingraffea 2011).[10] Recent studies by Alvarez et al. (2012) and Caulton et al. (2014) highlight the need to reduce methane leakages and to improve scientific estimation methods in order to maximize climate benefits of switching from coal to natural gas. Full lifecycle emission calculations are particularly pertinent for gas extracted from the Horn River Basin, where shale gas has a CO_2 content as high as 12 percent (versus the 2 percent of conventional natural gas), and companies are not required to use emission-reducing CCS.

While the FNFN is being asked to think globally, the government has not adopted the necessary industry regulations to make real progress towards realizing its claim that British Columbia will have the world's cleanest LNG industry (Stephenson, Doukas, and Shaw 2012; Stephenson and Shaw 2013). Consideration of upstream impacts poses a clear challenge to the idea that LNG is "clean." A 2013 report by Clean Energy Canada concludes: "Without policy leadership, LNG produced in British Columbia would emit more than three times the carbon pollution of that produced in current world-leading operations. The finding is based not only on the emissions of the proposed LNG plants, but on the carbon footprint of the commodity they would produce – from wellhead to waterline" (Glave and Moorhouse 2013, 4). While the government claims to be focused on making LNG production as "clean" as possible on the coast (BC Ministry of Energy and Mines 2012b), it is upstream in FNFN territory where the most emissions will be produced (Horne 2012), as is shown in Figure 6.[11] Processing plants in FNFN territory will create nearly five times the GHG emissions of the liquefaction process on the coast (ibid.).

[10] See Cathles et al. (2012) for a critique of the assumptions and methods employed in the Howarth, Santoro, and Ingraffea (2011) study. Cathles et al. (2012) estimate that the shale gas's GHG footprint is at most half that of coal.

[11] Initially, the government was committing to use hydropower to run the LNG plants on the coast but has since signalled that the liquefaction process will be powered by natural gas, which it has named a "clean energy" when being used to power LNG plants (Government of BC 2012).

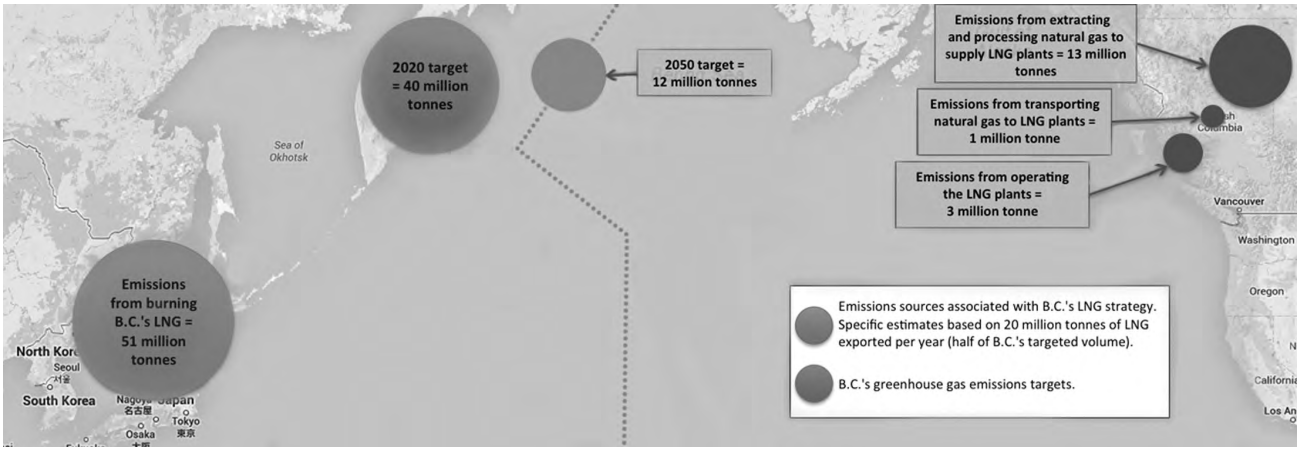


Figure 6. GHG emissions produced on the coast from LNG in contrast to GHG emissions produced in FNFN territory during shale gas extraction and processing. This figure first appeared in an article by Matt Horne from the Pembina Institute (Horne 2012).

DISCUSSION AND CONCLUSIONS

The nascent LNG industry in British Columbia is constantly in the news, but the direct connection between LNG and the industrial footprint of shale gas extraction in the northeast is rarely discussed. Despite aggressive provincial efforts to launch an LNG industry, there is no publicly available long-term development plan that connects LNG to shale gas development in the northeast and that considers the potential cumulative impacts to this region. We have sought here to illustrate the potential character of upstream impacts that are associated with unconventional gas extraction in the FNFN's traditional territory. Our analysis is preliminary; at this point, the research that would allow an assessment of these impacts and their potential trajectories under different scenarios of industrial development has simply not been done. But what our analysis makes clear is that more research is necessary before an informed decision on the pace and scale of shale gas development can be reached; impacts on ecosystems and on First Nations treaty rights must be better understood. Currently, all of the above-described development in FNFN territory is happening without systematic baseline studies, monitoring, or mitigation plans for cumulative impacts. We believe this is cause for alarm.

The FNFN territory contains three of British Columbia's four major basins and had experienced relatively limited industrial development before shale gas took off. The nation was in no way prepared for the rapid expansion in development. Nor, it appears, was the province: the industry has been launched in the absence of a regulatory framework capable of cumulative impact assessment or comprehensive monitoring that would enable the provincial government and industry to answer essential questions and concerns such as those raised by the FNFN. In the absence of independent scientific research, we cannot make the claim that the ecological integrity of the region is being compromised, but the impacts of large-scale oil and gas activity in northern Alberta – on ecosystems similar to those in northeast British Columbia – have been extensively researched. These studies document detrimental impacts to wildlife, biodiversity, and water (Kelly et al. 2009; Timoney and Lee 2009). Such changes, of course, have cascading impacts on the health and resilience of communities (Gosselin et al. 2010; Kelly et al. 2010; Tenenbaum 2009). In the context of British Columbia's northeast, numerous ENGOs and civil society groups have criticized the failure of oil and gas regulation to protect the environment (e.g., Campbell and Horne 2011; Parfitt 2011).

Crucially, the FNFN is reporting changes on the landscape and in the wildlife that are not being seriously investigated, let alone mitigated. From the FNFN's perspective, meaningful consultation on shale gas development is not taking place (Garvie and Shaw 2014). The FNFN – along with other Treaty 8 First Nations – has specific recommendations for the improvement of the consultative process (Garvie and Shaw, this issue). The FNFN has also clearly articulated its expectations of the research and regulatory changes that are necessary for shale gas development to take place within its territory. These expectations include but are not limited to (1) regional baseline studies before water licences are issued; (2) multi-year pre-development plans provided by both industry and government; (3) cumulative environmental assessment processes to ensure development is taking place sustainably; (4) the full protection of culturally significant land and water resources; and (5) third-party, independent monitoring and enforcement of all industry activities (FNFN 2012b). The potential impacts of shale gas development that we have explored in this article support these demands for informed decision making. Only when First Nations, provincial decision makers, and all British Columbians understand the potential impacts can the viability of an LNG industry be decided.

As the provincial government seeks to develop an LNG industry, it must build and mobilize an understanding of existing and potential impacts, both upstream and downstream, and create concrete plans to mitigate them. Currently, the FNFN is struggling to minimize the impacts within a system that is fundamentally unable to address concerns in anything more than a haphazard, superficial way (Garvie and Shaw 2014). Furthermore, the FNFN is but one example of numerous Indigenous and settler communities being affected by shale gas development and other regional transformations in both positive and negative ways. Treaty 8 communities in the Montney Trend are also experiencing unprecedented rates of shale gas development and in combination with numerous other energy industries, including mining developments, wind turbines, and the proposed Site C dam (Muir and Booth, 2011).

The challenge of launching the LNG industry in British Columbia is significant: gas markets are intensely competitive, a fact that puts tremendous pressure on governments to minimize the start-up and ongoing costs for the industry so companies can maximize economic benefits. Balancing this imperative with social, ecological, and governance needs is complex. However, protecting the environment – over both the short and long terms – is also crucial. When the industry is gone, British

Columbia will be left with its legacy: it is important for this legacy to be positive (Rondeau et al. 2013). Unfortunately, the provincial government's approach to developing the industry to date has been rushed and secretive. Consultations with affected communities or British Columbians have been extremely limited, hurried, and haphazard. In addition, there is no body of research identifying and assessing the social and environmental challenges the industry poses and considering how these could be mitigated; in fact, there is little indication the government is considering any of the industry's implications other than its potential to contribute to government coffers. This is a very risky way to proceed. If the province were to slow down, do the necessary research, and work to maximize the economic benefits over the long term, the environment could be better protected as well. Considering that the potential impacts of poorly regulated development are so profound, the FNFN and all British Columbians deserve a measured, well-researched approach.

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REVIEW

Methane emissions and climatic warming risk from hydraulic fracturing and shale gas development: implications for policy

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Abstract: Over the past decade, shale gas production has increased from negligible to providing >40% of national gas and 14% of all fossil fuel energy in the USA in 2013. This shale gas is often promoted as a bridge fuel that allows society to continue to use fossil fuels while reducing carbon emissions since less carbon dioxide is emitted from natural gas (including shale gas) than from coal and oil per unit of heat energy. Indeed, carbon dioxide emissions from fossil fuel use in the USA declined to some extent between 2009 and 2013, mostly due to economic recession but in part due to replacement of coal by natural gas. However, significant quantities of methane are emitted into the atmosphere from shale gas development: an estimated 12% of total production considered over the full life cycle from well to delivery to consumers, based on recent satellite data. Methane is an incredibly powerful greenhouse gas that is >100-fold greater in absorbing heat than carbon dioxide, while both gases are in the atmosphere and 86-fold greater when averaged over a 20-year period following emission. When methane emissions are included, the greenhouse gas footprint of shale gas is significantly larger than that of conventional natural gas, coal, and oil. Because of the increase in shale gas development over recent years, the total greenhouse gas emissions from fossil fuel use in the USA rose between 2009 and 2013, despite the decrease in carbon dioxide emissions. Given the projections for continued expansion of shale gas production, this trend of increasing greenhouse gas emissions from fossil fuels is predicted to continue through 2040.

Keywords: shale gas, natural gas, methane, greenhouse gases, global warming, bridge fuel

Introduction

Shale gas is natural gas tightly held in shale formations, and as for conventional natural gas, shale gas is composed largely of methane. The difference between shale gas and conventional natural gas is the mode of extraction. Shale gas cannot be obtained commercially using conventional techniques and has entered the market only recently as industry has used two relatively new technologies to extract it: high-precision horizontal drilling with high-volume hydraulic fracturing. Over the past decade, shale gas development in the USA has increased rapidly, a trend that both the Energy Information Agency (EIA) of the US Department of Energy and the industry expect to continue[1–3] (Figure 1). To date, almost all shale gas production in the world has occurred in the USA, a condition likely to continue for at least another decade.[2] The EIA projections for future growth in shale gas development may well be too rosy because both the expense of developing shale gas and the pattern of production from a shale gas well have proven to differ dramatically from that seen in conventional gas wells, with very rapid declines over the first year or two.[4] An independent assessment concludes that

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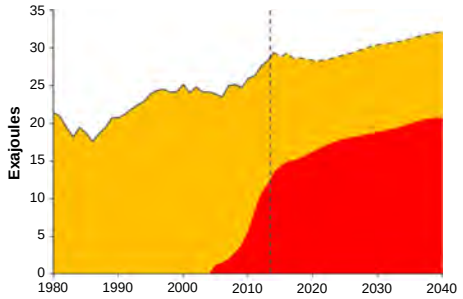


Figure 1 Natural gas production in the USA from 1980 to 2013 and future natural gas production until 2040 as predicted by the US Department of Energy in the *Annual Energy Outlook 2015*.[1] Conventional gas is indicated in yellow, shale gas in red.

shale gas production in the USA is likely to underperform the EIA estimates by almost 40% between now and 2040.[5] However, all these estimates are highly uncertain. If the EIA projections prove true, what might some of the environmental and public health consequences be?

Since shale gas development is a recent phenomenon, scientific investigations on its environmental and public health consequences are also quite new, with the first peer-reviewed studies published only in 2011.[6,7] Nonetheless, the literature has quickly grown, and evidence is accumulating of many adverse effects, including surface and groundwater contamination,[8] degraded air quality,[9,10] increased release of greenhouse gases,[11,12] increased frequency of earthquakes,[13] and evidence of harm to the health of humans and domestic animals, including farm livestock.[7,14–18]

The natural gas industry often points out that hydraulic fracturing has been in use for >60 years, implying that there is little new about shale gas development.[19] The scale of hydraulic fracturing used to develop shale gas, however, is far greater than the fracturing employed in previous decades for conventional gas, with two orders of magnitude increase in the volume of water and chemicals used from the hydraulic fracturing and even proportionally greater return of fracturing wastes to the surface.[6] Further, the use of high-volume hydraulic fracturing with high-precision directional drilling to develop shale gas leads to an intensity of development not generally seen with conventional natural gas and to the redevelopment of regions where conventional gas has largely played out, which may intensify some effects such as air emissions due to interactions with old wells and formations.[20] The appropriate focus when considering the environmental and public health effects of shale gas development is on the entire enterprise and use of the gas and not merely on the process of hydraulic fracturing.

This paper focuses on the role of methane emissions in determining the greenhouse gas footprint of shale gas. Natural gas, including shale gas, is often promoted as a bridge fuel that will allow society to continue to use fossil fuels over the coming decades while reducing carbon emissions. This was highlighted, for example, by President Obama in his State of the Union speech in January 2014.[21] For a given unit of energy consumed, the emissions of carbon dioxide from natural gas are substantially lower than from oil or coal,[11,22] which is the basis for the bridge fuel concept. However, natural gas is composed mostly of methane, a greenhouse gas that on a mass-to-mass basis is >100 times more powerful than carbon dioxide as an agent of global warming for the time when both gases persist in the atmosphere.[23] Consequently, even small releases of methane to the atmosphere from the development and use of shale gas can greatly influence the greenhouse gas footprint of shale gas.

How much methane is emitted?

My coauthors and I published the first peer-reviewed assessment of methane emissions from shale gas development in 2011.[11] We concluded that 3.8% (±2.2%) of the total lifetime production of methane from a conventional gas well is emitted into the atmosphere, considering the full life cycle from well to final consumer.[11] The data available for estimating emissions from shale gas were more scarce and more poorly documented at that time, but we estimated that the full life cycle emissions of shale gas were ~1.5-fold higher than that of conventional natural gas, or 5.8% (±2.2%).[11] We attributed the higher emissions to venting of gas during the flowback period following high-volume hydraulic fracturing, although a subsequent study identified other sources as well, such as drilling through strata previously developed for coal and conventional natural gas.[20] For both conventional gas and shale gas, we estimated the "downstream" emissions associated with storing gas and delivering it to market to be 2.5% (±1.1%), so our estimates for "upstream" emissions at the well site and from gas processing averaged 1.3% for conventional natural gas and 3.3% for shale gas.[11,12]

Through 2010, the US Environmental Protection Agency (EPA) continued to estimate emissions for conventional natural gas as 1.1%, with 0.9% of this from downstream emissions and 0.2% from upstream emissions, based on a joint EPA and industry study from 1996, as I discuss elsewhere.[12]

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They did not separately consider shale gas emissions. Soon after our paper was published in 2011, the EPA released new estimates that were very similar to ours in terms of upstream emissions: 1.6% for conventional natural gas and 3.0% for shale gas.[12] They kept their downstream emission estimates at 0.9%, yielding full life cycle emissions of 2.5% and 3.9%, respectively, for conventional gas and shale gas. EPA subsequently reduced their estimates for upstream emissions, cutting them approximately in half, relying on a non-peer-reviewed industry report[24] asserting that the 2011 estimates had been too high.[12,25] This yielded a full life cycle emission estimate for all natural gas in the USA, considering the contributions from both conventional and shale gas as of 2009, of 1.8%.[12] The inspector general of the EPA has called for improvements in the agency's approach in estimating emissions,[26] at least in part because of the 2013 decision to lower emission estimates.[12,25]

In our original 2011 paper, we called for new and better studies of methane emissions from the natural gas industry,[11] and in fact, many studies have been published in the subsequent 4 years. In 2014, I published a review of the new studies that had come out through February 2014.[12] One of these studies evaluated a large set of data from monitoring stations across the USA for the period 2007–2008, before the large increase in shale gas production, and concluded that the EPA estimate of 1.8% emission was clearly too low by a factor of at least 2 and that full life cycle emissions from conventional natural gas must be ≥3.6% on average across the USA.[27] Other, shorter term studies evaluated upstream emissions from shale gas and other unconventional gas development (ie, tight sands), with two finding high emissions (4%–9%)[25,28] and one published by Allen et al finding low emissions (0.4%).[29] In a summary published in early 2014, Brandt et al concluded that emissions from the natural gas industry, including both conventional gas and shale gas, could best be characterized as averaging 5.4% (±1.8%) for the full life cycle from well to consumer.[30] I accepted that conclusion and presented it as the best value in my 2014 review.[12]

Further thought and subsequent studies published since February 2014 have led me to reconsider. I now believe that emissions from conventional natural gas are somewhat <5.4%, based on the ^{14}C content of atmospheric methane globally, and emissions from shale gas are likely substantially more, based on global trends observed from satellite data and new evidence that the 2013 report by Allen et al of only 0.4% emissions[29] is likely to be flawed.

^{14}C content of methane and emissions from conventional natural gas

The ^{14}C radiocarbon content of methane in the planet's atmosphere provides a constraint on the emission rate from conventional natural gas systems. On average during the years 2000–2005, 30% of atmospheric methane was ^{14}C "dead", indicating that it came from fossil sources.[31,32] During this time period, the total global flux of methane to the atmosphere was probably in the range of 548 (±22) Tg CH_4 per year.[33] Therefore, the flux from fossil sources, 30% of the total flux, would have been ~165 Tg CH_4 per year. These fossil sources include fluxes associated with coal, oil, and natural gas development as well as natural seeps. Using global production data for coal and oil[34] and well-accepted methane emission factors for these two fuels as described elsewhere,[11] I estimate the combined methane emissions from oil and coal as ~50 Tg CH_4 per year. Using the 5.4% emission rate and global natural gas production estimates[34] for the years 2000–2005 yields a methane emission of 130 Tg CH_4 per year from the natural gas industry or 180 Tg CH_4 per year from all fossil fuels. This is too high compared to the ^{14}C constraint, suggesting that an emission rate of 5.4% for conventional gas is too high, even if natural seeps are negligible, as assumed by the Intergovernmental Panel on Climate Change (IPCC) in 2007 in their fourth assessment report.[35] Flux estimates from natural seeps are poorly constrained, but these natural emissions may be as great as 50 Tg CH_4 per year or higher.[31] If we instead use the mean emission factor from our 2011 paper for conventional natural gas of 3.8%,[11] the global flux from natural gas emissions is estimated as 91 Tg CH_4 per year, giving an emission flux from all fossil fuels of ~140 Tg CH_4 per year and an estimate of emissions from natural seeps of 15 Tg CH_4 per year. This combination is plausible, if uncertain, and the 3.8% factor agrees well with the robust conclusion from Miller et al that emissions from conventional natural gas systems in the USA, from before the shale gas boom, must have been at least 3.6% of production.[27]

How high are methane emissions from shale gas?

A paper published by Schneising et al in the fall of 2014 used satellite data to assess global and regional trends in atmospheric methane between 2003 and 2012.[36] Methane concentrations rose dramatically in the northern hemisphere, particularly after 2008. In a detailed comparison across the

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USA for the time periods 2006–2008 (before there was much shale gas or shale oil development) and 2009–2011 (after shale gas and oil production began in earnest), atmospheric methane concentrations rose dramatically in many of the major shale-producing regions. By evaluating trends in drilling and hydraulic fracturing activity, Schneising et al estimated methane emission rates of 9.5% (±7%) in terms of energy content during the 2009–2011 period for the two large shale regions – the Eagle Ford in Texas and the Bakken in North Dakota – where they felt most comfortable in estimating emissions.[36] They reported similar methane emissions for the Marcellus shale, but with much greater uncertainty in the analysis of the satellite data because of sparser spacing of wells, the mountainous terrain, and the proximity of the region to the Great Lakes. For the Bakken, shale oil production was far greater than gas production during this time period,[37] and the methane emissions may have been more associated with the oil production. However, natural gas was the dominant form of shale energy produced in the Eagle Ford formation between 2009 and 2011, contributing 75% of all shale energy with oil contributing 25%.[37] For the Marcellus shale, virtually all shale energy production through 2011 came from shale gas and not oil.[37] Therefore, it seems reasonable to attribute a methane emission rate of ~9.5% to shale gas development in the Eagle Ford and Marcellus formations.

The satellite methane emission estimate is largely for upstream emissions and does not fully account for downstream emissions during storage and delivery of gas to customers, which may on average add another 2.5% of methane emission.[11,12,22] The conclusion is that shale gas development during the 2009–2011 period, on a full life cycle basis including storage and delivery to consumers, may have on average emitted 12% of the methane produced. This is more than twice what we had estimated for shale gas in our 2011 analysis,[11] but the satellite-based estimate is based on more robust data and integrates across a period of 2 years. These shale gas emissions already may have a globally observable effect on methane in the atmosphere.[36]

The satellite-based estimate is ~20-fold greater than the estimate presented by Allen et al,[29] a study that worked closely with industry to measure emissions from various component processes of shale gas development. In my 2014 review, I suggested that the study by Allen et al may represent a best-case scenario for low emissions, given that measurements were made only at sites where industry allowed.[12] Since then, two papers published in 2015 have indicated that in fact the data in the Allen et al's paper may be flawed. Allen et al used a high-flow analyzer that employs two independent sensors, switching between a catalytic oxidation detector when methane levels are low and a thermal conductivity detector when methane concentrations are greater. Howard et al noted that the high-flow analyzer is prone to underestimating methane fluxes when switching between detectors.[38] A follow-up paper by Howard et al carefully evaluated the use of a high-flow analyzer by Allen et al and concluded that "the data reported by Allen et al. (2013) suggest their study was plagued by such sensor failure", and as a result "their study appears to have systematically underestimated emissions."[39] The sensor failure issue may well have affected other data reported by industry to the EPA and used by the EPA in their assessment of methane emissions, leading to serious underestimation.[38,39]

Several other recent studies have estimated upstream methane emissions from shale gas and other unconventional natural gas development (ie, from tight-sand formations) using more robust and more integrated measurement techniques such as airplane flyovers, but still with highly variable results. Estimates were ~30% greater than the satellite-derived data for one gas field,[40] were comparable in two other cases,[20,25] were only about half as much for two sets of measurements in another gas field,[28,41] and were substantially less in three other cases.[40] Peischl et al have suggested that higher emissions are associated with wet-gas fields and lower emissions with dry-gas fields.[40] Alternatively, the variation in emissions may simply reflect variance in space and/or in time: many of these studies were quite short in duration, for example, based on measurements made during airplane flyovers of just 1–2 days.[20,40] It is also important to note that these emission estimates are given as percentages of the gas production rates. The activity of the natural gas industry and rates of production in various gas fields are quite variable in time, and some of the differences in percentage emission rates may reflect this variability. For instance, Caulton et al reported high emission rates in the southwestern Pennsylvania portion of the Marcellus shale based on a June 2012 flyover,[20] while Peischl et al reported a very low percentage of emission rate in the northeastern Pennsylvania portion of the Marcellus shale from a July 2013 flyover.[40] Between these two flights, gas drilling activity for shale gas fell by 64% due to low prices for gas,[42] yet shale gas production remained high based on prior drilling and hydraulic fracturing.[1] If methane emission is more related to drilling and hydraulic fracturing activity than to production, these rapid changes in activity may explain at least part of the differences between the two estimates for Marcellus shale.

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I therefore conclude that the satellite data[36] provide the most robust estimates for upstream methane emissions from shale gas operations to date.

Is natural gas a bridge fuel?

Natural gas is widely promoted as a bridge fuel, a source of energy that allows society to continue to use fossil fuels while reducing greenhouse gas emissions over the next 2 decades or so, until renewable energy sources can more fully come on line. Our 2011 paper challenged that view because of methane emissions from natural gas, although we tempered our conclusion because of the uncertainty in methane emissions from shale gas development.[11] We also observed that the time frame over which one compares the consequences of emissions of carbon dioxide and methane is important in determining the overall greenhouse gas footprint of natural gas. While many studies have made this comparison only by averaging the radiative forcing of the two gases over a time of 100 years following emission, we compared on a 20-year timescale as well, following the lead of Hayhoe et al[22] and Lelieveld et al.[43] Methane has a residence time in the atmosphere of only 12 years,[23,33] while the influence of carbon dioxide emissions persists in the atmosphere for many hundreds of years or longer.[23] While both gases are in the atmosphere, the greenhouse warming effects of methane are >100-fold greater than for carbon dioxide on a mass-to-mass basis.[23] When compared on a 100-year average time after emission, the emitted methane is largely absent from the atmosphere for almost 90% of that time, which greatly underplays the importance of methane while it is in the atmosphere.

Our 2011 paper was criticized for comparing the consequences of methane and carbon dioxide over a 20-year period in addition to the 100-year period, with some authors stating that only a 100-year period should be used under the guidance of the IPCC.[44,45] This was never the case, and in the fourth synthesis report in 2007, the IPCC presented analyses based on both 20- and 100-year time periods.[35] Further, in the fifth synthesis report in 2013, the IPCC explicitly weighed in on this controversy, stating that "there is no scientific argument for selecting 100 years compared with other choices", and "the choice of time horizon […] depends on the relative weight assigned to the effects at different times".[23]

So what is the best choice of timescale? Given current emissions of greenhouse gases, the Earth is predicted to warm by 1.5°C above the preindustrial baseline within the next 15 years and by 2°C within the next 35 years.[46,47] Not only will the damage caused by global warming increase markedly but also at these temperatures, the risk of fundamentally altering the climate system of the planet becomes much greater.[48,49] Further, reducing emissions of carbon dioxide will do little if anything to slow the rate of global warming over these decadal time periods.[47] On the other hand, reducing emissions of methane has an immediate effect of slowing the rate of global warming.[47] For these reasons, comparing the global warming consequences of methane and carbon dioxide over relatively short time periods is critical. The use of a global warming potential (GWP) estimate for the 20-year time period from the IPCC fifth assessment report provides a convenient approach for doing so.[23] This GWP value of 86 is the relative radiative forcing for methane compared to that of carbon dioxide, averaged over 20 years, for two equal masses of the gases emitted into the atmosphere today.

Figure 2 compares the greenhouse gas footprint of shale gas with that of conventional natural gas, oil, and coal. Methane emissions of shale gas are derived from the satellite-based estimates of Schneising et al[36] with an additional 2.5% emission rate assumed from downstream transport, storage, and distribution systems.[11,12,22] Methane emissions for the other fuels are those used in our 2011 paper, which is 3.8% (±2.2%) for conventional natural gas.[11] Methane emissions are converted to carbon dioxide equivalents using the 20-year GWP value of 86 from the IPCC assessment.[23] While for a

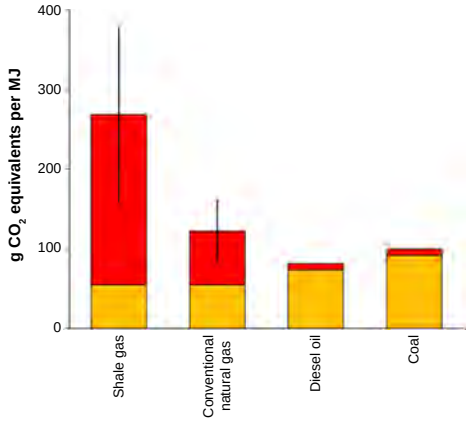


Figure 2 The greenhouse gas footprints of shale gas, conventional natural gas, oil, and coal expressed as g CO_2 equivalents per MJ of heat produced.
Notes: Yellow indicates direct and indirect emissions of carbon dioxide. Red indicates methane emissions expressed as CO_2 equivalents using a global warming potential of 86. Vertical lines for shale gas and conventional natural gas indicate the range of likely methane emissions. Emissions for carbon dioxide for all fuels and for methane from conventional natural gas, oil, and coal are as in Howarth et al.[11] Mean methane emission estimate of shale gas is taken as 12% based on Schneising et al[36] as discussed in the text.

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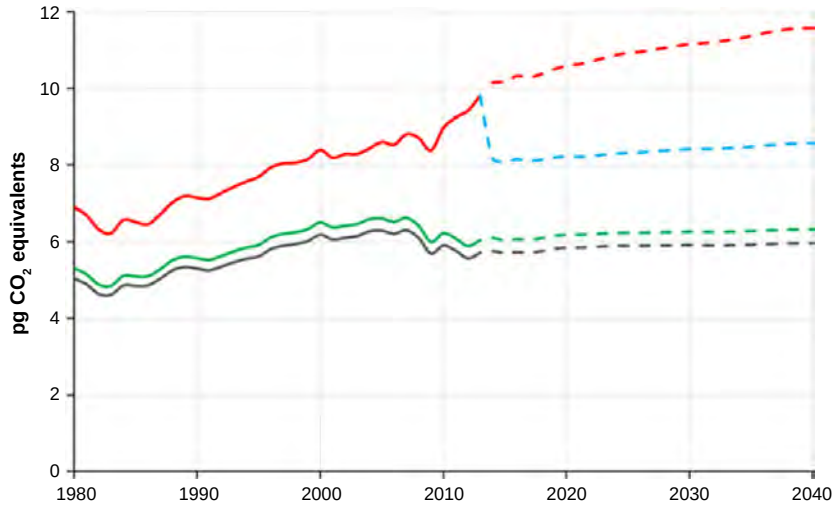


Figure 3 Trends in greenhouse gas emissions from fossil fuel use in the USA from 1980 to 2013 and future trends predicted until 2040 based on historical energy use and energy predictions in the *Annual Energy Outlook 2015*.[1] Shown are: emissions just for carbon dioxide (gray line); emissions for carbon dioxide and for methane using EPA assumptions, which undervalue the importance of methane (green line); emissions for carbon dioxide and methane based on emission factors for conventional natural gas, oil, and coal from Howarth et al,[11] mean methane emission estimates for shale gas of 12% based on Schneising et al[36] as discussed in the text, and a global warming potential for methane of 86 (red line); and future emissions for carbon dioxide and methane based on the same assumptions as for the red line, except assuming that shale gas emissions can be brought down to the level for conventional natural gas (blue line). Historical data are shown by solid lines; dashed lines represent future predictions.
Abbreviation: EPA, Environmental Protection Agency.

given unit of energy produced, carbon dioxide emissions are less for shale gas and conventional natural gas than those for oil and coal, the total greenhouse gas footprint of shale gas is substantially greater than that of the other fossil fuels when methane emissions are included (Figure 2). Note that this is true even for the low-end estimates of methane emissions from the Schneising et al study. The greenhouse gas footprint of conventional natural gas is also higher than that of conventional oil and coal for the mean estimate of methane emissions and still greater than or comparable to that of these other fuels even at the low-end estimate for methane emissions. Natural gas – and shale gas in particular – is not a bridge fuel when methane emissions are considered over an appropriate timescale.

Trends in greenhouse gas emissions from fossil fuels in the USA

Figure 3 shows the greenhouse gas emissions from all use of fossil fuels in the USA from 1980 to 2013 and projections for emissions through 2040, based on data for fossil fuel use and projections of future use from the EIA *Annual Energy Outlook 2015* report[1] and carbon dioxide emissions per unit of energy produced for each fuel.[11,22] Total carbon dioxide emissions fell in the early 1980s due to economic recession, but as the economy recovered, emissions rose steadily until the great recession of 2008. Carbon dioxide emissions continued to fall from 2008 to 2013 and are predicted to remain relatively flat through 2040.[1] President Obama and others have attributed the decrease in carbon dioxide emissions since 2008 to a switch from coal to shale gas,[21,50] although a recent analysis by Feng et al concludes that the sluggish economy was the more significant cause.[51]

When methane emissions are included in the analysis, we see some important differences in trends in national greenhouse gases. For the top line in Figure 3, methane emissions are included as carbon dioxide equivalents using the 20-year GWP of 86 from the IPCC fifth assessment[23] and methane emission factors from the 2011 study by Howarth et al[11] for coal, conventional oil, and conventional natural gas and a factor of 12% based on the satellite data discussed earlier for shale gas. In this analysis, methane contributes 28% of total fossil fuel emissions for the USA in 1980 and 42% in 2013 (Figure 3). The increasing trend in the relative importance of methane in the greenhouse gas emissions of the USA is due to

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an increasingly large portion of the nation's fuel mix coming from natural gas and particularly from shale gas for the time since 2009.[1] Shale gas production was negligible before 2005 (Figure 1) but rose to contribute 14% of all fossil fuel energy used in the USA in 2013.[1] Importantly, while carbon dioxide emissions fell between 2008 and 2013, total greenhouse gas emissions including methane fell only briefly in 2008 before beginning a rapid increase that lasted through 2013 and are projected to continue to rise through 2040.

The US EPA includes methane emissions in the natural gas inventory, but they do so in a manner that greatly undervalues their importance. This can be seen in Figure 3, where the green line that is just above and closely tracks the gray line for carbon dioxide emissions is based on EPA assumptions: a methane emissions rate of only 1.8% from natural gas and a GWP of 21 based on the 100-year time period from the second IPCC assessment from 1996.[52] Note that the EPA used this GWP value of 21 for many years, through 2013, before switching to the 100-year value of 25 in 2014 from the IPCC fourth assessment from 2007. The 2013 assessment of the IPCC gives a GWP value of 34 for the 100-year period but, as noted earlier, also states that the 100-year time frame is arbitrary. A shorter time frame, such as the 20-year GWP of 86 used in the top line in Figure 3, far better accounts for the importance of methane to global warming in the critical next few decades as the temperature is predicted to reach 1.5°C–2°C above the preindustrial baseline if methane emissions are not reduced.

Implications for policy on shale gas

As of January 2015, the US EPA has taken some steps to reduce emissions from shale gas, but how effective these will be in reducing methane emissions remains unclear. A draft regulation proposed in 2012 would have prevented the venting of methane during the flowback period following hydraulic fracturing, with some exceptions such as for wells in frontier regions not yet serviced by pipelines.[53] This would be important, since such venting can emit a large amount of methane.[11] However, the final regulation distinguishes between two phases of flowback, an "initial flowback stage" and a "separation flowback stage". Venting of methane and other gas is explicitly allowed during the initial stage, and recovery of the gas is only required during the separation stage.[53] The separation stage is supposed to commence as soon as it is technically feasible to use a flowback gas separator. At this stage, EPA requires that the gas be sold to market, reinjected into the ground, used as an onsite fuel, or, if none of these are possible, flared (ie, burned). No direct venting of gas is allowed during this separation flowback stage, "except when combustion creates a fire or safety hazard or can damage tundra, permafrost or waterways".[53] Much is left to operator judgment as to when the shift from the initial stage to the separation stage occurs and whether an exception is necessary, which would seem to make enforcement of these regulations difficult.

Further, EPA continues to ignore some methane emission sources, such as during the drilling phase. Caulton et al identified many wells that were emitting high levels of methane during this drilling phase, before the drillers had even reached the target shale, and long before hydraulic fracturing,[20] perhaps because drillers were encountering pockets of methane gas from abandoned conventional gas wells or abandoned coal mines. Our understanding of emission sources remains uncertain, with the study of shale gas methane emissions commencing only in the past few years.[6] Adequate regulation to reduce emissions requires better knowledge of sources, as well as better oversight and enforcement.

Nonetheless, methane emissions from shale gas can be reduced to some extent. I suggest that the best-case scenario would have these emissions reduced to the level for conventional natural gas, or ~3.8% for the full well-to-consumer life cycle. This best-case scenario is explored in Figure 3 (dashed blue line), where it is assumed that shale gas methane emissions are reduced from 12% to 3.8% as of 2014. Even still, methane accounts for 30% of total greenhouse gas emissions from fossil fuels in the USA throughout the period from 2014 to 2040 under this scenario, and total emissions continue to rise, albeit more slowly than without the aggressive reduction in shale gas methane emissions. This best-case scenario seems unlikely, and actual emissions from shale gas are likely to range between 3.8% and 12%, giving total greenhouse gas emissions for all fossil fuels that lie between the dashed red and blue lines in Figure 3.

Methane emissions severely undercut the idea that shale gas can serve as a bridge fuel over the coming decades, and we should reduce our dependence on natural gas as quickly as possible. One of the most cost-effective ways to do so is to replace in-building use of natural gas for domestic space and water heating with high-efficiency heat pumps. Even if the electricity that drives these heat pumps comes from coal, the greenhouse gas emissions are far less than from the direct use of natural gas.[12] Heating is the major use for natural gas in the USA, making this change of use imperative.

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Concluding thoughts and a path forward

Should society continue to use coal rather than convert toward more electricity production from shale gas? Absolutely not. The carbon dioxide emissions from burning any fossil fuel will continue to influence the climate for hundreds of years into the future, and coal is the worst of the fossil fuels in terms of carbon dioxide emissions. Given the imperative of also reducing methane emissions to slow global warming over the coming few decades, though, the only path forward is to reduce the use of all fossil fuels as quickly as possible. There is no bridge fuel, and switching from coal to shale gas is accelerating rather than slowing global warming.

Fortunately, society does have a path forward: recent studies for the State of New York[54] and for the State of California[55] have demonstrated that we can move from a fossil fuel-driven economy to one driven totally by renewable energy sources (largely solar and wind) in a cost-effective way using only technologies that are commercially available today. The major part of the transition can be made within the next 15 years, largely negating the need for shale gas, with a complete transition possible by 2050. A critical part of these plans is to use modern, efficient technologies such as heat pumps and electric vehicles, which greatly reduce the overall use of energy. The cost of the transition is less than the cost currently paid for death and illness related to air pollution from using fossil fuels.[54] The costs of renewable energy today are equal to or lower than those from using fossil fuels, when the external costs to health and the climate are considered.

In June 2015, six of the largest oil and gas companies in Europe including BP and Shell called for a carbon tax as a way to slow global warming.[56] An editorial in the *New York Times* endorsed this idea,[56] and indeed, a carbon tax is perhaps the best way to equalize the playing field for renewable energy technologies. The International Monetary Fund estimates that subsidies to fossil fuels globally are in the range of $5 trillion per year, with much of this due to the effects of global warming and consequences on human health.[57] A carbon tax would help rectify these subsidies and help promote renewable energy. However, the editorial in the *Times* made a fundamental error by ignoring methane emissions when they wrote "this tax would reduce demand for high-carbon emission fuels and increase demand for lower emission fuels like natural gas".[56]

Any carbon tax should recognize the two faces of carbon: the two major greenhouse gases, carbon dioxide and methane, are both carbon gases. Both of these carbon gases are critically important, and the 2013 IPCC synthesis report tells us that the effects of global methane being emitted today matches the consequences of carbon dioxide emissions as drivers of global warming.[23] The modes of interaction with the planetary climate system are dramatically different, though. The climate is slow to respond to changes in carbon dioxide emissions, and so immediate reductions in emissions would take 30–40 years before having an influence on slowing warming, but the emissions have a warming effect on the climate that will persist for hundreds of years.[23,46,47] The climate responds quickly to changes in methane emissions, and reducing methane emissions is essential for slowing climate change over the coming 30–40 years; however, the methane remains in the atmosphere for little more than 1 decade, and methane emissions have no lasting influence on the Earth's climate systems in future centuries, unless global warming over the coming decades leads to fundamental thresholds and changes in the climate.[12,23,46,47]

A carbon tax that adequately addresses the immediacy of global climate change must include both carbon gases. Methane emissions should be taxed using the best available information on methane emissions. And the tax on methane should adequately reflect the importance of methane in current global warming and its influence in global warming over the critically important next few decades. Taxing methane emissions at 86 times the tax for carbon dioxide emissions, using the 20-year GWP from the most recent IPCC synthesis report,[23] would accomplish this.

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1316-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1316-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1316-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Mary Paterson
To: Public Comment
Subject: Concern #3 re draft SEIS for PSE LNG - leakage rates of methane
Date: Sunday, November 11, 2018 6:55:23 PM
Attachments: EECT-61539-perspectives-on-air-emissions-of-methane-and-climatic-warmin_100815-2.pdf

Dear Puget Sound Clean Air Agency,

An alarming mistake that is made in the draft SEIS for the PSE LNG plant is in regard to the data it offers for leakage of methane at extraction sites. It is increasingly evident that gas companies under-report methane emissions, either because they intentionally avoid accurate measurements or because they intentionally lie about what they measure.

When independent scientists measure real emissions, what they find is alarming. Three cases in point are the Denver Basin, the Uinta Basin in Utah, and the Los Angeles basin. Looking at extraction sites alone (leaving aside for the moment the reality of leaks during pipeline transportation and processing), these three geographic examples show leakage alarmingly above the 3% threshold that would make natural gas/methane as bad as coal in its impact as a greenhouse gas. In Denver, National Oceanic and Atmospheric Administration (NOAA) scientists measured an average of 4% leakage at extraction sites. In Utah, Picarro scientists measured an average of 11% leakage. And in LA, NOAA again measured an average of 17% methane leakage from oil and gas extraction sites. (My source for these figures is the video report linked above, "Chasing Methane with Mark Bittman" from the New York Times.) What would truthful, accurate, up-to-date measurements of methane leakage at the British Columbia sites show? What would truthful, accurate, up-to-date measurements of methane leakage during transportation via pipelines and compressor stations show? The sources used in the current draft SEIS are not reliable; the SEIS must be revised to give us scientifically accurate information about methane leakage rates.

Finally, the draft SEIS needs to include citations from and a serious consideration of the work of Robert Howarth,Tony Ingraffeo, and others at the Cornell University Methane Project. These presentation slides (November 2017) evaluating the possible sources of increased methane in the atmosphere are a beginning (the graph on slide #2 shows that emissions of CO2, CH4, and black carbon must *all* be greatly reduced if we are to succeed in keeping global warming under 2 degrees C). Another important reference is an article by Howarth available for download as a pdf in this link (please see graph, page 5).

Hoping and praying that these comments are taken seriously,
Mary Paterson
11532 Alton Ave NE
Seattle WA 98125

1317-1 13. LCA Inputs and Assumptions - Natural Gas Source
1317-2 3. Outside of SEIS Scope

From: Mary Paterson
To: Public Comment
Subject: Concern #2
Date: Sunday, November 11, 2018 6:48:04 PM
Attachments: 184887-Article Text-196156-1-10-20150204-1.pdf

Dear Puget Sound Clean Air Agency,

I submitted a comment approximately one week ago with three comments rolled together in one email. I am re-sending concerns 2 and 3 separately to make sure they are "counted" in your tallies and in your consideration. (Concern #1 was the draft SEIS reliance on an outdated study from 2007 for assessing the Global Warming Potential of methane and, related to that, using a 100-period only for assessing the impact of methane leakage and slippage -- not a 10 and/or a 20-year-period, which is the crucial period that we face according to the very recent UN IPCC report.)

I am very concerned that the draft SEIS is based solely on PSE's claim that all the gas piped into the plant at the Tacoma tideflats/Port of Tacoma will come from British Columbia. I don't know how PSE can guarantee the source of the gas over a period of several decades. But let us for the sake of this comment assume that all the gas will come from BC gas mines. One concern that many of us who oppose this project have is for the Missing and Murdered Indigenous Women, a phenomenon of violence that correlates the presence of "man camps" (predominantly men hired to dig and lay pipelines and work at extraction sites) with the disappearance and murder of First Nations and Native American Indian women. I do not know if it is "within the scope" of Puget Sound Clean Air Agency's mission to consider this violence in its decision-making regarding the Tacoma LNG project. But perhaps it is within the scope of PSCAA's evalulation to consider this examination of the potential impact -- cultural, health, climate change -- of unconventionally mined gas (i.e. shale gas, fracked gas) on the Fort Nelson First Nations people and their land and water in northeastern British Columbia. This study, its questions and findings, need to be part of the PSE Tacoma LNG SEIS.

Thank you again for your diligence in pursuing a truthful SEIS for the PSE LNG project. I feel strongly that the current draft of the SEIS is not just inadequate but in fact untruthful about the air impact of the PSE LNG project in Tacoma.

Sincerely,
Mary Paterson
11532 Alton Ave NE
Seattle WA 98125

SHALE GAS DEVELOPMENT IN FORT NELSON FIRST NATION TERRITORY:

Potential Regional Impacts of the LNG Boom

KATHRYN H. GARVIE, LANA LOWE, AND KARENA SHAW*

OVER THE PAST DECADE, abundant "unconventional" gas reserves throughout North America have become economically and technically viable through the combined use of two extraction technologies – horizontal drilling and hydraulic fracturing (or "fracking") – and, as a result, production on the continent has boomed.[1] In 2012, the Government of British Columbia released a Natural Gas Strategy outlining its vision to dramatically increase provincial natural gas production and exports (BC Ministry of Energy and Mines 2012a). To escape the gas glut (and subsequent low prices) in North America, British Columbia is pursuing growing Asian markets. In order to be exported to Asia, the gas must be piped to the province's west coast, liquefied (i.e., turned into "liquefied natural gas" – LNG – at coastal plants), and then shipped in tankers across the Pacific Ocean. In the BC Jobs Plan (Government of BC 2011), the Liberal government committed to having three LNG plants up and running by 2020. The year 2014 will be pivotal in British Columbia's energy history as a number of proponents working towards a 2020 opening decide on final investments (Government of BC n.d.).

It is widely accepted that at most only a few of the more than twelve proposed LNG plants will ever be built. Even so, independent researchers have raised concerns about the potential implications of these developments for British Columbia's efforts to reduce greenhouse gas (GHG) emissions (Jaccard and Griffin 2010; Stephenson, Doukas, and Shaw

* This research was funded by Carbon Management Canada, Project D215, and a SSHRC Master's Fellowship. The authors would like to express their thanks to Roberto Concepcion, Trevor Lantz, Ellie Stephenson, Joanna Reid, Graeme Wynn, and three anonymous reviewers for their thoughtful assistance with this article.

[1] Hydraulic fracturing injects large volumes of water mixed with sand and chemicals underground at high pressures to create fissures in the rock, allowing the trapped gas to flow into the well.

2012). What is less widely appreciated – and has not been adequately researched or assessed – is the issue of the upstream environmental impacts of the LNG industry (Council of Canadian Academies 2014). In British Columbia, the expansion of natural gas production for LNG exports means the development of unconventional gas reserves. For example, between 2005 and 2010, the percentage of wells in the Horn River Basin targeting shale gas jumped from 3.4 to 85.4 percent of all new wells drilled (BC Oil and Gas Commission 2010). Under the current environmental assessment regime, only those impacts associated with pipelines and gas processing plants are systematically assessed. However, First Nations in the shale gas plays that will feed the LNG industry are already experiencing a much wider range of effects. One of the nations most directly affected is the Fort Nelson First Nation (FNFN), whose territory includes three of the four major shale gas plays in British Columbia.[2]

This research, conducted with the Fort Nelson First Nation Lands Department, was prompted by concerns that the province has not meaningfully assessed the risks and impacts of an unconventional gas industry in FNFN territory. Nor is there adequate data or resources available for the nation to assess the risks on its own. In what follows, we tell the story of the rapid expansion of natural gas developments in the FNFN's territory through figures developed by the FNFN Lands Department. These figures reveal a race for industrial tenure, landscape disturbance on a massive scale, threats to wildlife, risks to water quality and quantity, and a high level of GHG emissions. After a short description of the treaty rights and land uses of the FNFN and the policy context of the BC natural gas industry, we present and describe these impact-related figures in turn, also referring to a wider literature on natural gas development in British Columbia and elsewhere. We aim to illustrate the scale and pace of industrial expansion and to identify a range of associated impacts. This investigation of potential impacts reveals an urgent need for a strategic assessment of the cumulative upstream effects of the LNG industry. Appeals for baseline studies and cumulative environmental assessments of the oil and gas industry in northeast British Columbia are widespread, coming from First Nations, researchers, and non-governmental organizations alike (West Coast Environmental

[2] The four major shale gas plays in British Columbia are the Liard Basin, the Horn River Basin, the Cordova Embayment, and the Montney Trend. The first three fall almost entirely within FNFN territory (see Figure 1); the majority of the Montney shale gas play, however, lies farther south. In this article, we focus largely on the plays within FNFN territory but also draw, where relevant, from research regarding shale gas developments in the Montney Trend.

Law 2004; Parfitt 2011; Campbell and Horne 2011; University of Victoria Environmental Law Centre 2013; Gale and Lowe 2013; Garvie and Shaw 2014 (this issue). Assessing, understanding, and mitigating cumulative effects is an essential precondition to the LNG industry proceeding in a way that protects the ecological and social resilience of the region, including the constitutionally protected treaty rights of the Treaty 8 First Nations on whose territory this development will proceed. An informed understanding of cumulative effects, in turn, should be the basis for any decision making around how the industry develops.

CRITICAL CONTEXT

Fort Nelson First Nation

The Fort Nelson First Nation is made up of fourteen extended families, whose traditional languages are Dene and Cree. The FNFN territories cover approximately seventy-two thousand square kilometres of northeast British Columbia. Since time immemorial, FNFN ancestors have lived and travelled throughout their traditional territories on seasonal rounds to hunt, fish, trap, and gather. Family groups travelled on their individual seasonal rounds between villages, fishing and hunting camps, and traplines by riverboat, dogteam, horseback, and foot. Families were dispersed among ten different village sites before moving to the main reserve six kilometres south of the town of Fort Nelson in the 1960s. Members of the FNFN continue to visit the village sites and actively hunt and trap in their family hunting grounds, but recent shale gas developments are making it increasingly difficult to do so. The FNFN's territory contains three large shale gas basins – the Liard Basin, the Horn River Basin, and the Cordova Embayment (see Figure 1) – within which extraction-related activities have rapidly expanded over the last ten years.

The FNFN has shared its territories with settlers and their industries for decades. Some families have supplemented their incomes by working with local guide outfitters and prospectors as well as in forestry and oil and gas extraction. The conventional oil and gas industry has been operating within FNFN territory since the 1940s, but the rise of unconventional gas has ushered in a new era of development. This shale gas era is placing immense pressure on existing regulation, and provincial oil and gas governance structures, to evolve with the changing character of the industry and to address novel environmental concerns (Stefik and Paulson 2010).

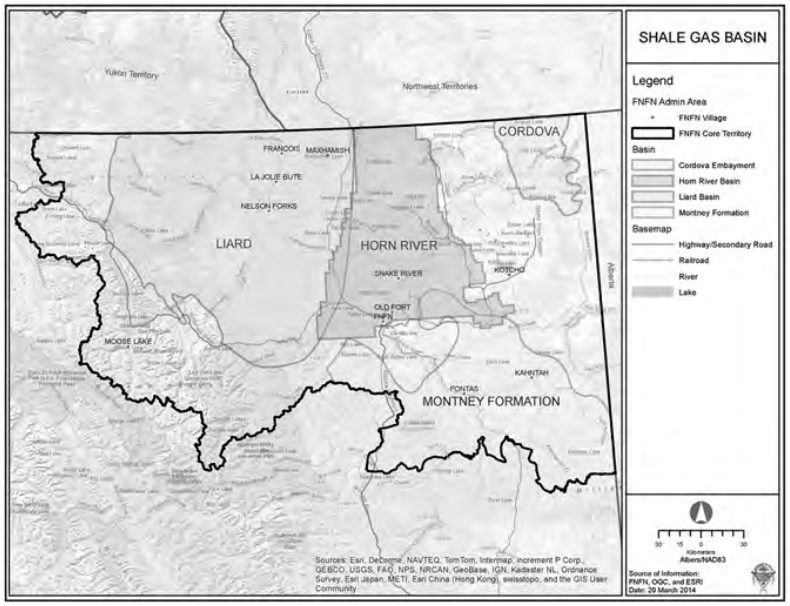


Figure 1. Shale gas basins in Fort Nelson First Nation's territory. *Source*: Fort Nelson First Nation Lands Department.

The FNFN understands its relationship to the Crown through Treaty 8. When the FNFN signed on to Treaty 8 in 1910, it agreed to share the land on the condition "that the treaty would not lead to any forced interference with their mode of life"; this included the right to "be as free to hunt and fish after the treaty as they would be if they had never entered into it" (Laird, Ross, and McKenna 1899). As unconventional gas development accelerates, the FNFN is concerned that these rights are not being respected and protected by government regulators (see Garvie and Shaw 2014). This concern was highlighted on 16 April 2014 when the province made the decision to exempt sweet gas plants from environmental assessment requirements without consulting with First Nations. After a quick and united response from BC First Nations, the province retracted the decision within twenty-four hours (CBC News 2014; Prystupa 2014). There is a growing demand from First Nations for collaborative, culturally and scientifically sound research to be gathered prior to any decisions being made on the future of the BC LNG industry (Garvie and Shaw 2014). As the FNFN chief Sharleen Gale and lands director Lana Lowe explain in a *Globe and Mail* opinion piece: "To truly have peace, we as a people must be able to share the wealth and protect

the integrity of our land. We need new mechanisms for decision-making and both the industry and government must be willing to change their ways" (Gale and Lowe 2013). Imminent decisions on how British Columbia's LNG and shale gas industries advance have the potential to strongly influence the province's relationship with First Nations.

The Rush for Tenure

Shale gas development is different from the conventional oil and gas development that has been occurring in FNFN territory since the 1940s in at least two ways: (1) it is happening at an increased pace and scale and (2) the use of hydraulic fracturing introduces new environmental concerns, especially regarding water. The sudden economic viability of shale gas extraction in North America due to a combination of new technologies and higher natural gas prices created a tenure buying frenzy in northern British Columbia between approximately 2005 and 2010. By the time FNFN members heard about shale gas and fracking at a town hall meeting hosted by an industry proponent in 2008, petroleum and natural gas tenure sales had already peaked in the Horn River Basin at $1.1 billion (C. Adams 2011). Oil and gas company Devon Canada set a provincial record in August 2008 for the largest single bonus paid at a petroleum and natural gas rights disposition when it purchased a 5,789-hectare drilling licence in the Horn River Basin for $75.8 million. By 2010, industry had bought up tenures covering over 75 percent of the Horn River Basin and had moved on to the Liard Basin, spending $47 million and $110 million on tenures in 2009 and 2010, respectively (ibid.). Despite lower natural gas prices, prolific production rates at test wells in the Liard are still anticipated to offset the higher production costs in the remote northeast area (Apache 2012). According to the Northern Rockies Regional Municipality (n.d.), at the end of 2012, the provincial government had accrued more than $3.6 billion from land sales and royalties in the Horn River Basin and the Liard Basin. Figure 2 compares tenure holdings in FNFN territory in 2006 and 2013. The FNFN was not consulted on petroleum and natural gas tenure sales until June 2012, despite the implications of these sales for the future of FNFN territory and the ability to practice constitutionally protected treaty rights.

The tenure rush in British Columbia was followed by a relative lull in development as the economic recession slowed American markets and they became saturated with domestic shale gas, which was also being rapidly developed. US gas prices have remained below six dollars per million British thermal units (mmBtu) since 2009, after a 2008 peak of

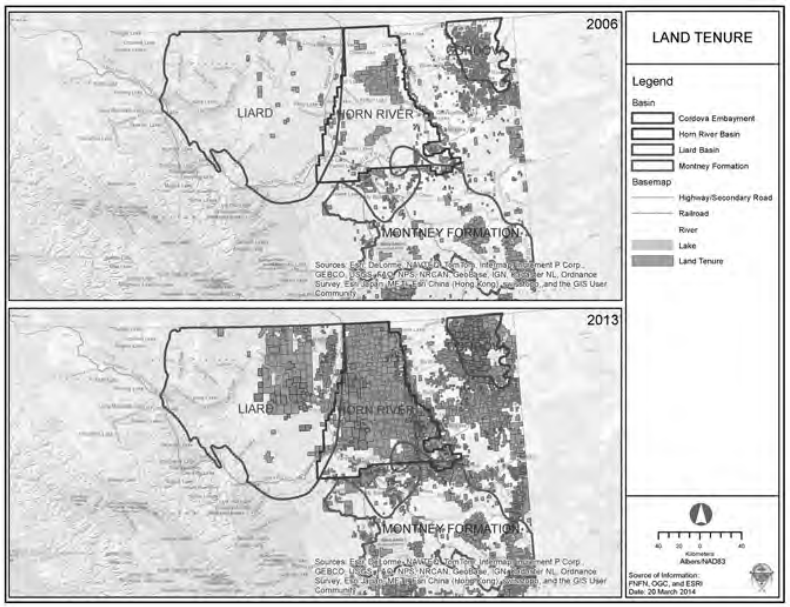


Figure 2. Petroleum and natural gas tenures in FNFN territory in 2006 and 2013. *Source*: Fort Nelson First Nation Lands Department.

more than thirteen dollars (Nasdaq n.d.). As a consequence, there is ongoing restructuring in the industry (Jang 2014; Lewis 2014; Penner 2014). For example, Devon Canada is looking to sell off its assets in the Horn River Basin, which it set records purchasing just six years ago (Cattaneo 2013). However, other companies are investing for the long haul, building processing facilities and pipelines and conducting seismic exploration while they wait for better markets (e.g., Apache n.d.; Quicksilver Resources Inc. n.d.).[3]

While industry is preparing for the coming LNG boom, the provincial government appears less than motivated to develop governance and regulatory frameworks that will protect environmental and social conditions upstream (CBC News 2014; CCA 2014). The FNFN Lands Department

[3] One study into the long-term viability of the BC LNG industry cited research from other jurisdictions that shows that production rates at individual shale gas wells have been found to drop significantly after the first couple of years (Hughes 2014). It is unknown whether this kind of drop in well productivity is affecting the industry restructuring in British Columbia's northeast because well depletion rates are not publicly available. However, based on shale gas well production rates elsewhere, David Hughes (2014) predicts that industry will require continual well development in the northeast to maintain production rates over time, resulting in fifty thousand new wells by 2040.

is working to fill this critical gap, but, as stated previously, there are currently no regulatory requirements for industry to carry out baseline studies on its tenures. Without this information, the scope and scale of development impacts on First Nations territories and cultural practices cannot be fully understood as development progresses (Tollefson and Wipond 1998; Booth and Skelton 2011).

Once tenure has been acquired, all development – with the exception of projects that trigger an environmental assessment (i.e., pipelines and gas processing plants) – must be approved through the Oil and Gas Commission's permitting process.[4] As explained in Garvie and Shaw 2014, approval of developments proceeds on an individual, permit-by-permit basis. No long-term, landscape-scale plans are made available to the public or affected parties such as the FNFN.[5] As a consequence, assembling a landscape-scale picture of present impacts, let alone potential future impacts, requires mapping hundreds of different permits individually. The FNFN's Lands Department is currently undertaking this work. In what follows, we document the scale of development that has taken place to date on the tenures purchased in FNFN territory and explore some of the potential impacts of this development.

The Development Footprint

Figure 3 displays the cumulative oil and gas activities in the FNFN's traditional territories as of March 2014. The solid patches are grids of seismic lines one to three metres in width, occurring approximately every 240 metres across the landscape. If all of the linear disturbance in the Liard, Horn River, and Cordova basins were laid end to end, it would wrap almost two times around the planet. In the most heavily affected areas of the FNFN's territory, there are over 9.98 kilometres of linear disturbance per square kilometre.

Figure 4 illustrates what this level of disturbance looks like at Two Island Lake, an area of particular cultural importance to the FNFN (FNFN 2012a). A number of families continue to hunt, fish, trap, and gather in the area, despite industry's extensive impacts on the landscape. Within the 100-square-kilometre area represented in Figure 4, there are 90 wells, 25 pipeline right-of-ways, 7 processing facilities, 114 water withdrawal points, and 2,385 kilometres of seismic lines. As of March 2014, there

[4] For more information on responsibilities of the BC OGC, see https://www.bcogc.ca/about-us.

[5] This lack of long-term, landscape-scale oversight is in contrast to industries with similar landscape-scale impacts such as forestry, where companies must have a Forest Stewardship Plan approved for their licence area before submitting site-specific permit applications (Forest and Range Practices Act SBC 2002 c. 69).

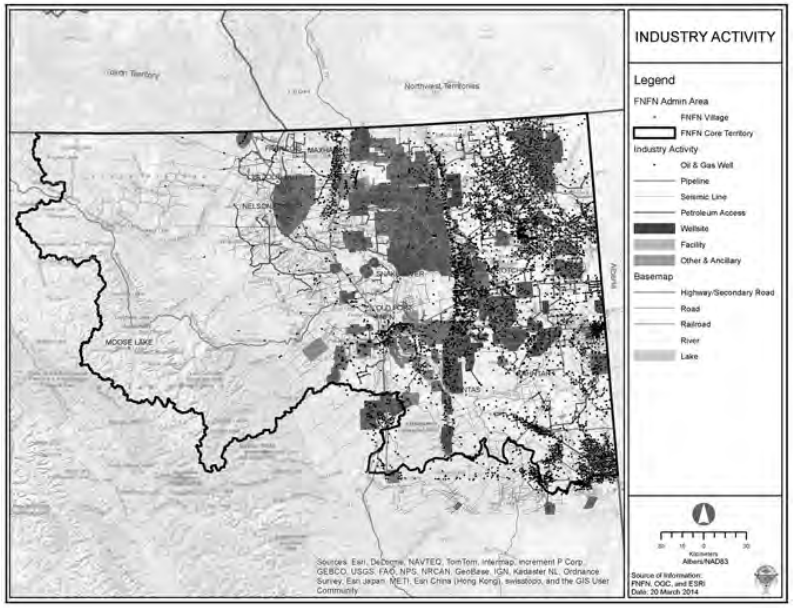


Figure 3. All oil and gas activity in FNFN territory as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

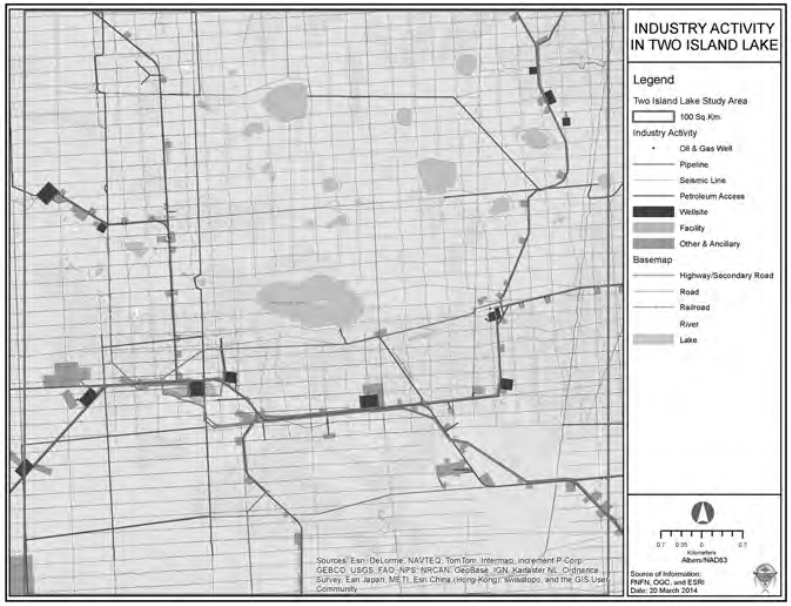


Figure 4. All oil and gas activity in a one-hundred-square-kilometre area around Two Island Lake as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

has been no systematic assessment of the cumulative impacts of these developments on the wildlife and ecosystems of the northeast.

The pace and scale of development depicted in these figures have a wide array of potential impacts on the region that go almost entirely unstudied. In the following sections, we discuss the potential risks to wildlife, water, air, and human health based on northeast British Columbia's unique environmental and social characteristics and research conducted in other jurisdictions where shale gas development is taking place.

POTENTIAL IMPACTS

Threats to Wildlife

The development footprint in FNFN territory displayed in Figure 3 and Figure 4 also undeniably tells a story of changing wildlife habitat in northeast British Columbia. The impacts these changes are having on wildlife are unknown since the necessary research has not been conducted. Potential impacts, however, can be extrapolated not only from a number of studies on wildlife experiencing comparable levels of habitat disturbance from other industries but also from studies on livestock living in close proximity to conventional and unconventional oil and gas operations in other places. The threats to wildlife fall into two categories: (1) spatial changes to habitat (which alter predator-prey and wildlife-human interactions) and (2) degradation of habitat (which has impacts on wildlife health).

One of the few species that has been extensively researched in the northeast is the boreal woodland caribou; we use it here as an example of how the industrial footprint of unconventional gas development can have a variety of far-reaching effects on wildlife. The boreal woodland caribou appears on both provincial and federal "red lists" of endangered species. The FNFN territory contains five of the six boreal woodland caribou populations in the northeast. A 2009 government report identified oil and gas exploration as the greatest risk to northeast caribou populations (Goddard 2009). Seismic lines and roadways have been found to alter predator-prey relationships, resulting in increased caribou mortalities and decreasing populations (James and Stuart-Smith 2000; Latham et al. 2011). Additionally, noise and lighting from roadways, processing facilities, and well sites deter wildlife and alter habitat ranges (Dyer et al. 2001; Sorensen et al. 2008). Twelve of the fifteen core caribou habitat areas in northeast British Columbia have surpassed the

61 percent anthropogenic impact threshold (Theissen 2009), at which point a population becomes unsustainable (Sorensen et al. 2008). The preservation of remaining caribou habitat in the northeast is critical.

Similar studies have not been conducted on culturally significant species to the FNFN such as moose and beaver. However, it is well known that habitat fragmentation and degradation is associated with significant species loss (Fahrig 2003). Baseline studies are critical in order to determine how much development can take place before species loss begins. In the Peace-Moberly region of the northeast (south of FNFN territory) it is already too late: a study conducted in 2008 found that the cumulative effects of landscape change from industrial development (namely, conventional oil and gas development, mining, forestry, and agriculture) are synergistic, additive, and antagonistic in nature, and have reached a point at which they are threatening the ecological integrity of the area as a whole (Nitschke 2008). The alarming results of this study highlight the need for better industry regulation in FNFN territory to ensure that this region does not suffer the same fate.

Degraded habitats threaten wildlife health in numerous ways. If the land and waterways become contaminated, so, too, will the animals that are sustained by them. Studies have not been conducted in the northeast, but there are first-hand accounts from hunters about increasing rates of sick animals with tumours and failing organs. Outside British Columbia, where much shale gas development is occurring in more populated areas, the majority of research on fracking and animal health concerns livestock. In the United States, proximity to shale gas developments and exposure to frack fluids has been found to cause negative health effects in livestock, including increased mortality (Bamberger and Oswald 2012). In a 2014 article, Bamberger and Oswald draw connections between livestock health close to drilling operations and food safety in the United States. Additionally, studies conducted in conventional oil and gas fields in Alberta have found decreased fertility in cattle and increased calf mortality rates due to air pollution (Waldner 2008). In the BC context, these kinds of risks could have serious health implications for wildlife as well as for community members hunting and trapping these animals.

Northeast British Columbia is one of the few remaining places on earth that still has boreal forest able to support a wide array of large mammals, including grizzly bears, American black bears, wood bison, bighorn sheep, moose, caribou, and wolves (Laliberte and Ripple 2004). The forests, muskeg, and lakes of FNFN territory are home to over thirty endangered or vulnerable species, including woodland boreal caribou, wood bison, grizzly bear, wolverine, and fisher, as well as a number

of culturally significant species, such as freshwater whitefish and bull trout (BC Ministry of Environment n.d.). Members of the FNFN are already speaking out about changes to the landscape and the health and behaviour of the animals, but without baseline data and ongoing monitoring, provincial regulators and industry representatives often reject community members' concerns as anecdotal. Allowing an information and data vacuum to persist in northeast British Columbia facilitates uninformed industry growth and the marginalization of FNFN concerns.

Water Use and Contamination

Concerns about water use and contamination arise virtually everywhere the shale gas industry has expanded (Freyman 2014; International Energy Agency 2012), and northeast British Columbia is no exception (Parfitt 2011; Campbell and Horne 2011). Until recently, to support the rapid development of the industry, almost all water use has been facilitated by "Section 8" water permits. Section 8 water permits are for short-term water use access and are issued by the Oil and Gas Commission (OGC) according to section 8 of the BC Water Act. As of 2011, water permits are required for surface water removal from any surface water body, including borrow pits (a human-made pit created during the removal of construction materials). Up until April 2014, British Columbia was the only Canadian province that did not regulate groundwater use.[6] Figure 5 displays all of the surface water diversion points approved under section 8 water permits in FNFN territory as of March 2014. These permits only represent a small fraction of water that would be required should LNG move forward at the pace anticipated by the provincial government.

In the shale gas industry water is primarily used for hydraulic fracturing. The amount of water required to frack a well varies dramatically, depending on the local geography. A report for the BC Ministry of Energy and Mines (MEM) found that, on average, 34,911 cubic metres of water are used per well in the Horn River Basin, while just 1,925 cubic metres are used per well in the Montney Trend (Johnson and Johnson 2012).[7] Apache holds the record for the world's largest frack job at a pad

[6] As of 29 April 2014, there is a new Water Sustainability Act in British Columbia. Of particular note is the introduction of groundwater regulation and environmental flow requirements. See Curran (2014) for a summary of the new legislation.

[7] A BC OGC factsheet documents much higher averages: 77,000 cubic metres per well in the Horn River Basin and 7,000 to 10,000 cubic metres per well in the Montney Trend (BC OGC 2014b). The discrepancy between these two sets of numbers – which both come from official provincial documents – reveals the ongoing uncertainty of data regarding water use for hydraulic fracturing in British Columbia.

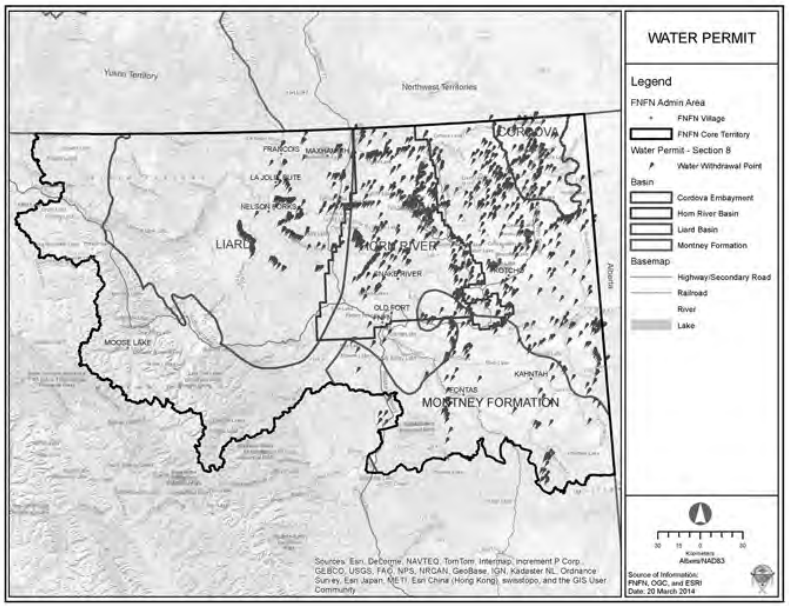


Figure 5. All of the water diversion points approved in FNFN territory through OGC-issued section 8 water permits as of March 2014. *Source*: Fort Nelson First Nation Lands Department.

with sixteen wells near Two Island Lake. It took 111 days to frack the sixteen wells a total of 274 times. In total, 980,420 cubic metres of water and 50,000 tons of sand were used during the operation (C. Adams 2011; Parfitt 2011). That volume of water is equivalent to 392 Olympic swimming pools' worth. Due to contamination, once water is used for fracking, it must be forever removed from the hydrologic cycle; in the absence of treatment facilities in the northeast, companies fulfill regulatory requirements by disposing of flowback in deep-injection wells.[8]

The vast majority of water being used by industry for fracking is surface water; just 7 percent comes from source wells, despite the fact that saline aquifers have been found beneath large areas of tenure (BC Oil and Gas Commission 2014a). While some companies are taking advantage of these sources, there are no regulatory requirements that ensure that non-potable sources are prioritized and that water recycling is carried out.

As the industry is becoming established, companies are moving towards long-term water licences. Nineteen water licences in the FNFN's

[8] Flowback is a highly saline, toxic solution containing both the frack fluid chemicals injected into the well during the fracking operation and naturally occurring toxins from within the shale formation, such as radioactive barium and arsenic (Vengosh et al. 2014).

territories are currently awaiting government approval. The first licence granted has resulted in a lawsuit by the FNFN alleging inadequate consultation in the granting of the licence and significant flaws in the licence itself, particularly in terms of the lack of regulatory oversight. The FNFN had experience with this lack of government oversight and enforcement when, in the summer of 2012, during a one-in-thirty-year drought, 182,785 cubic metres of water were removed from North Tsea Lake after the lake's discharge dropped below the zero withdrawal limit (Chapman 2013). The use of multi-well pads (such as the one at North Tsea Lake) increases the intensity of water demand over short periods of time (Rivard et al. 2014). The impacts of these withdrawals on the surrounding ecosystem will never be fully understood because no baseline data exist. There continues to be no systematic monitoring of impacts, despite the unprecedented scale of withdrawals relative to the water body's size allowed under the licence.

The OGC is working reactively to fill the regulatory gaps created by the widespread introduction of hydraulic fracturing, which has brought with it unique governance challenges, including water use and contamination (Stefik and Paulson 2010). In a recent effort to deal with increased water use by the oil and gas industry, the OGC has developed a publicly available NorthEast Water Tool (NEWT) that assesses water availability based on estimates of monthly and annual water flows and existing water permits and licences. It is used as a "decision-support tool" for short-term water permits and long-term water licences (BC Oil and Gas Commission n.d.). Environmental flow needs are also estimated; however, considering the limited baseline data for the region the accuracy of these estimates is questionable. The longer the OGC waits before implementing rigorous data collection the less useful the information will be because ecosystems will already be in an altered state.

Water acquisition is only part of the controversy surrounding hydraulic fracturing; water contamination is also a significant concern. According to the US Environmental Protection Agency (EPA) (2012), there are five stages in the hydraulic fracturing water cycle that could lead to groundwater contamination: (1) water acquisition, (2) chemical mixing, (3) well injection, (4) flowback and produced water, and (5) waste water treatment and waste disposal. The real contamination effects of these five stages remain largely unknown. Whether or not hydraulic fracturing is responsible for drinking water well contamination in a number of jurisdictions across the United States is highly contested; a lack of pre-drilling data makes it difficult to identify fracking as the

sole potential cause of contamination (Vidic et al. 2013), but there are a number of studies that have found a correlation between a drinking well's proximity to a shale gas well and contaminants in the water. For example, Fontenot et al. (2013) found that wells within three kilometres of active gas wells in the Bennett Shale had higher levels of arsenic, selenium, strontium, and total dissolved solids. In the Marcellus Shale in the Appalachian Basin, household wells less than one kilometre from gas wells had concentrations six times higher of methane and concentrations twenty-three times higher of ethane (Jackson et al. 2013).

In 2013, the US EPA backed away from finishing an independent, peer-reviewed study on contaminated wells in Pavillion, Wyoming, after releasing a draft report linking the contamination to fracking in the area (Vidic et al. 2013). The EPA passed the study off to the state of Wyoming in June of that year. The state will be working with Encana, a company with operations in the region, to complete the research (Office of Governor Matt Mead 2013). This sequence of events raises alarms for a number of reasons, not least of which is industry's involvement in research in which it has a strong vested interest. Water studies currently being conducted in FNFN territory are also industry funded. The BC government has installed six groundwater monitoring wells in the Montney Play but has yet to install a test well in the Horn River Basin (Rivard et al. 2014).

The shale gas reservoirs in northeast British Columbia lie at much greater depths than do the deposits in the United States, where groundwater contamination has been reported. However, there are still potential pathways through which contaminants could travel to water bodies. In 2012, the BC OGC completed a study that found that seismic events in "the Horn River Basin between 2009 and 2011 were caused by fluid injection during hydraulic fracturing in proximity to pre-existing faults" (BC Oil and Gas Commission 2012). The seismic events studied did not result in any wellbore deformation on vertical well sections (ibid.), but seismicity may be a risk to well casings over time, creating vertical fluid and gas migration pathways. Unlike other provinces, British Columbia does not require well casing integrity tests prior to fracking (Rivard et al. 2014). While integrity tests are required for deep injection wells, a report released by the University of Victoria Environmental Law Centre still raises concerns about the potential for compromised well casings, especially considering that 60 percent of the oil and gas industry's

waste (including flowback and produced water) has been injected into wells that are more than forty-three years old (Carr-Wilson 2014).[9]

Researchers have also raised concerns over fracking's effect on the speed of advective transport rates. Myers (2012) found that advective transport rates of contaminants up into aquifers are dramatically increased after hydraulic fracturing; modelling of the Marcellus Shale indicates that contaminant transport that naturally takes up to tens of thousands of years may only take tens or hundreds of years after hydraulic fracturing occurs (ibid.). Independent hydrologists in British Columbia have also raised concerns about advective transport and compromised well casings over time, but supporting research has not yet been conducted.

In addition to the potential for groundwater contamination during fracking or disposal, there is also the potential for surface water contamination from spills and the improper treatment, storage, and disposal of frack fluids and flowback. Less rigorous regulatory standards for disposal and storage in some states have resulted in numerous incidences of aquatic species death in rivers (Vengosh et al. 2014) and livestock mortality (Bamberger and Oswald 2014). A study of forest health after direct exposure to frack fluids in West Virginia resulted in 56 percent tree mortality within two years (M.B. Adams 2011; see also Warner et al. 2013). Other threats to surface water and surrounding ecosystems include increased sedimentation from road and pipeline development and elevated traffic levels (Entrekin et al. 2011).

In sum, even at current levels of development, industry demand for water has been significant and poorly regulated. Even with massive recent increases in shale gas development, there is currently no independent, publicly available assessment of the implications of water use at this scale or of the dangers of contamination in the northeast.

Air Quality and GHG Emissions

The emissions from shale gas developments are also drastically underresearched: preliminary analyses of the impacts on local air quality and global GHG emissions have shown cause for concern and the need for extensive and more comprehensive studies. Recent and preliminary work in northeast British Columbia has shown that shale gas development may affect local air quality in ways that have impacts on human health. In June 2012, the Fraser Basin Council released Phase One of a human

[9] See the University of Victoria Environmental Law Centre's report *Improving the Regulation of Fracking Wastewater Disposal in BC* for a list of fifteen recommendations to improve the safety of deep-injection wells in the oil and gas industry (Carr-Wilson 2014).

health risk assessment currently under way: *Identifying Health Concerns Relating to Oil and Gas Development in Northeast BC*. The BC Ministry of Health contracted the report after public concerns about oil and gas development began to grow with the industry's rapidly increasing activity (Fraser Basin Council 2012). The report documents numerous environmental pathways created by the oil and gas industry that could result in adverse human health effects: inhalation of "sour gas" (gas with a high hydrogen sulphide content), inhalation or ingestion of diesel dust from increased traffic and operating equipment, and the ingestion of contaminated wildlife and water (ibid., 25). Phase Two of the study is due later this year. Based on some of the concerns raised during Phase One, the Ministry of Health provided two additional air-monitoring sites in the South Peace (BC Ministry of Health 2012). In FNFN territory, however, there continue to be no provincial monitoring stations, despite rapid industrial growth in the Horn River Basin. Without air quality data, community concerns about risks to long-term health and ecological well-being remain unexplained and unaccounted for in scientific research and policy. This information gap raises serious concerns, particularly given what is known about the massive production of contaminants by the upstream oil and gas sector in Canada as a whole: in 2006, the sector accounted for 17 percent of sulphur oxide, 21 percent of nitrogen oxide, and 28 percent of volatile organic compounds in the country (Environment Canada 2013).

Numerous studies in the United States have linked air quality during well completion to human health effects. McKenzie et al. (2012) found that individuals living within 0.8 kilometres of a gas well completion are at a greater risk of contracting cancer from elevated benzene levels and that they also experience other subchronic health effects. An air quality study in Colorado conducted at wells during the initial drilling phase found non-methane hydrocarbons at levels beyond those that have been found to cause lower IQ scores in prenatally exposed children (Colborn et al. 2014). Adgate, Goldstein, and McKenzie (2014) argue that the research on populations living near unconventional gas developments has been scientifically limited in a number of ways (e.g., self-selected populations, small sample sizes, lack of consistently collected data) and that more substantive research on risks to human health risk assessments is needed.

The FNFN often hears the argument that local sacrifices will result in net benefits for the planet through reduced GHG emissions. In the fall of 2013, Premier Christy Clark declared that by developing shale

gas and LNG "we are doing the world a favour" (Canadian Press 2013). Not only is this ethically dubious, its validity has been questioned by several researchers. A number of studies indicate that emissions from shale gas over its full lifecycle are significantly higher than are the emissions from conventional gas (Jiang et al. 2011; Karion et al. 2013), and they are possibly as high as coal if carbon capture and storage (CCS) technologies and fugitive emission reduction measures are not adopted (Howarth, Santoro, and Ingraffea 2011).[10] Recent studies by Alvarez et al. (2012) and Caulton et al. (2014) highlight the need to reduce methane leakages and to improve scientific estimation methods in order to maximize climate benefits of switching from coal to natural gas. Full lifecycle emission calculations are particularly pertinent for gas extracted from the Horn River Basin, where shale gas has a CO_2 content as high as 12 percent (versus the 2 percent of conventional natural gas), and companies are not required to use emission-reducing CCS.

While the FNFN is being asked to think globally, the government has not adopted the necessary industry regulations to make real progress towards realizing its claim that British Columbia will have the world's cleanest LNG industry (Stephenson, Doukas, and Shaw 2012; Stephenson and Shaw 2013). Consideration of upstream impacts poses a clear challenge to the idea that LNG is "clean." A 2013 report by Clean Energy Canada concludes: "Without policy leadership, LNG produced in British Columbia would emit more than three times the carbon pollution of that produced in current world-leading operations. The finding is based not only on the emissions of the proposed LNG plants, but on the carbon footprint of the commodity they would produce – from wellhead to waterline" (Glave and Moorhouse 2013, 4). While the government claims to be focused on making LNG production as "clean" as possible on the coast (BC Ministry of Energy and Mines 2012b), it is upstream in FNFN territory where the most emissions will be produced (Horne 2012), as is shown in Figure 6.[11] Processing plants in FNFN territory will create nearly five times the GHG emissions of the liquefaction process on the coast (ibid.).

[10] See Cathles et al. (2012) for a critique of the assumptions and methods employed in the Howarth, Santoro, and Ingraffea (2011) study. Cathles et al. (2012) estimate that the shale gas's GHG footprint is at most half that of coal.

[11] Initially, the government was committing to use hydropower to run the LNG plants on the coast but has since signalled that the liquefaction process will be powered by natural gas, which it has named a "clean energy" when being used to power LNG plants (Government of BC 2012).

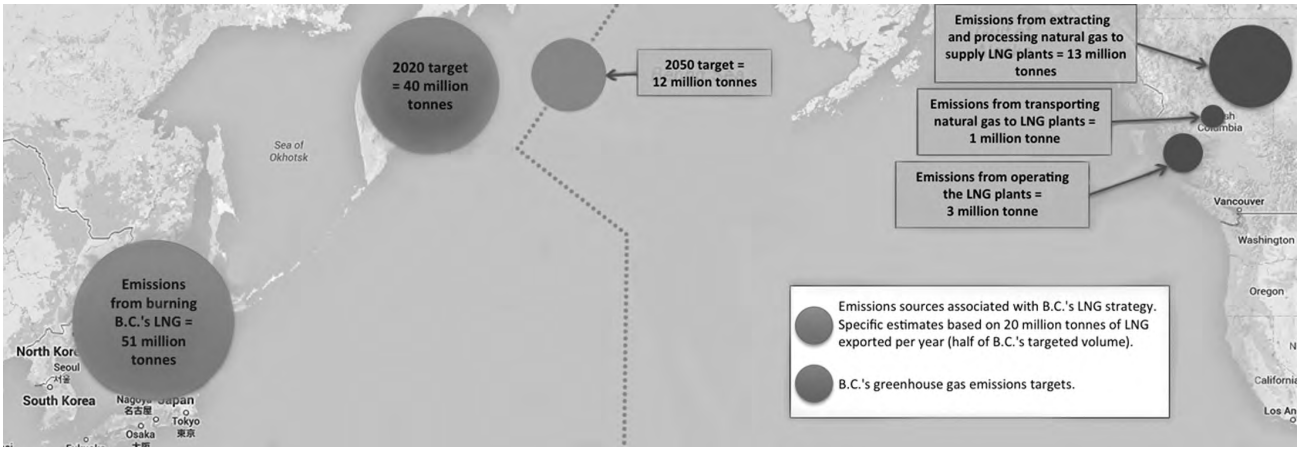


Figure 6. GHG emissions produced on the coast from LNG in contrast to GHG emissions produced in FNFN territory during shale gas extraction and processing. This figure first appeared in an article by Matt Horne from the Pembina Institute (Horne 2012).

DISCUSSION AND CONCLUSIONS

The nascent LNG industry in British Columbia is constantly in the news, but the direct connection between LNG and the industrial footprint of shale gas extraction in the northeast is rarely discussed. Despite aggressive provincial efforts to launch an LNG industry, there is no publicly available long-term development plan that connects LNG to shale gas development in the northeast and that considers the potential cumulative impacts to this region. We have sought here to illustrate the potential character of upstream impacts that are associated with unconventional gas extraction in the FNFN's traditional territory. Our analysis is preliminary; at this point, the research that would allow an assessment of these impacts and their potential trajectories under different scenarios of industrial development has simply not been done. But what our analysis makes clear is that more research is necessary before an informed decision on the pace and scale of shale gas development can be reached; impacts on ecosystems and on First Nations treaty rights must be better understood. Currently, all of the above-described development in FNFN territory is happening without systematic baseline studies, monitoring, or mitigation plans for cumulative impacts. We believe this is cause for alarm.

The FNFN territory contains three of British Columbia's four major basins and had experienced relatively limited industrial development before shale gas took off. The nation was in no way prepared for the rapid expansion in development. Nor, it appears, was the province: the industry has been launched in the absence of a regulatory framework capable of cumulative impact assessment or comprehensive monitoring that would enable the provincial government and industry to answer essential questions and concerns such as those raised by the FNFN. In the absence of independent scientific research, we cannot make the claim that the ecological integrity of the region is being compromised, but the impacts of large-scale oil and gas activity in northern Alberta – on ecosystems similar to those in northeast British Columbia – have been extensively researched. These studies document detrimental impacts to wildlife, biodiversity, and water (Kelly et al. 2009; Timoney and Lee 2009). Such changes, of course, have cascading impacts on the health and resilience of communities (Gosselin et al. 2010; Kelly et al. 2010; Tenenbaum 2009). In the context of British Columbia's northeast, numerous ENGOs and civil society groups have criticized the failure of oil and gas regulation to protect the environment (e.g., Campbell and Horne 2011; Parfitt 2011).

Crucially, the FNFN is reporting changes on the landscape and in the wildlife that are not being seriously investigated, let alone mitigated. From the FNFN's perspective, meaningful consultation on shale gas development is not taking place (Garvie and Shaw 2014). The FNFN – along with other Treaty 8 First Nations – has specific recommendations for the improvement of the consultative process (Garvie and Shaw, this issue). The FNFN has also clearly articulated its expectations of the research and regulatory changes that are necessary for shale gas development to take place within its territory. These expectations include but are not limited to (1) regional baseline studies before water licences are issued; (2) multi-year pre-development plans provided by both industry and government; (3) cumulative environmental assessment processes to ensure development is taking place sustainably; (4) the full protection of culturally significant land and water resources; and (5) third-party, independent monitoring and enforcement of all industry activities (FNFN 2012b). The potential impacts of shale gas development that we have explored in this article support these demands for informed decision making. Only when First Nations, provincial decision makers, and all British Columbians understand the potential impacts can the viability of an LNG industry be decided.

As the provincial government seeks to develop an LNG industry, it must build and mobilize an understanding of existing and potential impacts, both upstream and downstream, and create concrete plans to mitigate them. Currently, the FNFN is struggling to minimize the impacts within a system that is fundamentally unable to address concerns in anything more than a haphazard, superficial way (Garvie and Shaw 2014). Furthermore, the FNFN is but one example of numerous Indigenous and settler communities being affected by shale gas development and other regional transformations in both positive and negative ways. Treaty 8 communities in the Montney Trend are also experiencing unprecedented rates of shale gas development and in combination with numerous other energy industries, including mining developments, wind turbines, and the proposed Site C dam (Muir and Booth, 2011).

The challenge of launching the LNG industry in British Columbia is significant: gas markets are intensely competitive, a fact that puts tremendous pressure on governments to minimize the start-up and ongoing costs for the industry so companies can maximize economic benefits. Balancing this imperative with social, ecological, and governance needs is complex. However, protecting the environment – over both the short and long terms – is also crucial. When the industry is gone, British

Columbia will be left with its legacy: it is important for this legacy to be positive (Rondeau et al. 2013). Unfortunately, the provincial government's approach to developing the industry to date has been rushed and secretive. Consultations with affected communities or British Columbians have been extremely limited, hurried, and haphazard. In addition, there is no body of research identifying and assessing the social and environmental challenges the industry poses and considering how these could be mitigated; in fact, there is little indication the government is considering any of the industry's implications other than its potential to contribute to government coffers. This is a very risky way to proceed. If the province were to slow down, do the necessary research, and work to maximize the economic benefits over the long term, the environment could be better protected as well. Considering that the potential impacts of poorly regulated development are so profound, the FNFN and all British Columbians deserve a measured, well-researched approach.

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1318-1 5. Regulatory Framework
1318-2 21. LCA Inputs and Assumptions - Additional Air Pollutants
1318-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1318-4 7. SEPA Alternatives

From: Mary Paterson
To: Public Comment
Subject: Comment re draft SEIS for Tacoma LNG
Date: Wednesday, November 14, 2018 10:33:51 AM

Dear Puget Sound Clean Air Agency,

Thank you for your consideration of this comment regarding Puget Sound Energy's illegal Liquefied Natural Gas project at the Tacoma tideflats/port of Tacoma. I say illegal because they have been arrogantly building without a permit for many months and because they have not meaningfully consulted the Puyallup Tribe whose land/water they may in fact be building on, not just building next to.

I question the argument that ships using LNG as fuel represent a reduction in greenhouse gas emissions and emissions of other pollutants compared to doing nothing. Given that the two TOTE ships slated for conversion to LNG are already burning ultra-low sulfur diesel and plugging into electricity when in port, it seems likely that what they are doing is already cleaner in respect to air quality impact than what they would be doing if they complete their conversion to LNG and start burning it. I base this statement on the fact that the LNG facility will be releasing arsenic, cadmium,, hydrogen sulfide, sulfur dioxide, and volatile organic compounds (VOCs), all of which are known threats to human health. (This may be among the reasons that the industry recommends natural gas facilities be built three miles away from human populations, which obviously the PSE LNG plant in Tacoma is not.) My concern that ships burning LNG represents any kind of improvement over the present is heightened in consideration of NOAA scientists' and other scientists' independent measurements of methane leaks at the point of extraction: in the Denver Basin, the Uinta Basin, and the Los Angeles basin, methane leaks at the point of extraction alone have been measured to be 4%, 11%, and 17% respectively, well above the 3% threshold that makes methane as a fuel worse than coal in terms of its GHG emissions.

Furthermore, the draft SEIS is written with the false assumption that there are no alternatives for the shipping industry in respect to meeting new emission standards or seeking to go beyond those standards in facing the reality of climate change. Three Horizon ships have already met the new emission standards by purchasing sulfur scrubbers from the Netherlands (please see Gillie, J. 2015, February 2, "Horizon Lines to modify Alaska ships," Tacoma *News Tribune*. Retrieved from http://www.thenewstribune.com/news/business/article26251261.html). And the international shipping industry has published a broad list of ways ships can reduce their emissions, increase their efficiency, and completely de-carbonize by 2035, including technological, operational, and alternative fuel-based methods (Please see "Decarbonizing Martime Transport Pathways to zero-carbon shipping by 2035," published by the International Transport Forum, pp. 25-30).

The SEIS for the PSE LNG project needs to be rewritten in light of documented fact that the shipping industry already has alternative technologies and methods for reducing its carbon footprint: LNG as a fuel is far from the only alternative. In fact, it is a worse alternative.

We await your evaluation with great hope and anticipation!

Mary Paterson
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REVIEW

Methane emissions and climatic warming risk from hydraulic fracturing and shale gas development: implications for policy

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Abstract: Over the past decade, shale gas production has increased from negligible to providing >40% of national gas and 14% of all fossil fuel energy in the USA in 2013. This shale gas is often promoted as a bridge fuel that allows society to continue to use fossil fuels while reducing carbon emissions since less carbon dioxide is emitted from natural gas (including shale gas) than from coal and oil per unit of heat energy. Indeed, carbon dioxide emissions from fossil fuel use in the USA declined to some extent between 2009 and 2013, mostly due to economic recession but in part due to replacement of coal by natural gas. However, significant quantities of methane are emitted into the atmosphere from shale gas development: an estimated 12% of total production considered over the full life cycle from well to delivery to consumers, based on recent satellite data. Methane is an incredibly powerful greenhouse gas that is >100-fold greater in absorbing heat than carbon dioxide, while both gases are in the atmosphere and 86-fold greater when averaged over a 20-year period following emission. When methane emissions are included, the greenhouse gas footprint of shale gas is significantly larger than that of conventional natural gas, coal, and oil. Because of the increase in shale gas development over recent years, the total greenhouse gas emissions from fossil fuel use in the USA rose between 2009 and 2013, despite the decrease in carbon dioxide emissions. Given the projections for continued expansion of shale gas production, this trend of increasing greenhouse gas emissions from fossil fuels is predicted to continue through 2040.

Keywords: shale gas, natural gas, methane, greenhouse gases, global warming, bridge fuel

Introduction

Shale gas is natural gas tightly held in shale formations, and as for conventional natural gas, shale gas is composed largely of methane. The difference between shale gas and conventional natural gas is the mode of extraction. Shale gas cannot be obtained commercially using conventional techniques and has entered the market only recently as industry has used two relatively new technologies to extract it: high-precision horizontal drilling with high-volume hydraulic fracturing. Over the past decade, shale gas development in the USA has increased rapidly, a trend that both the Energy Information Agency (EIA) of the US Department of Energy and the industry expect to continue[1–3] (Figure 1). To date, almost all shale gas production in the world has occurred in the USA, a condition likely to continue for at least another decade.[2] The EIA projections for future growth in shale gas development may well be too rosy because both the expense of developing shale gas and the pattern of production from a shale gas well have proven to differ dramatically from that seen in conventional gas wells, with very rapid declines over the first year or two.[4] An independent assessment concludes that

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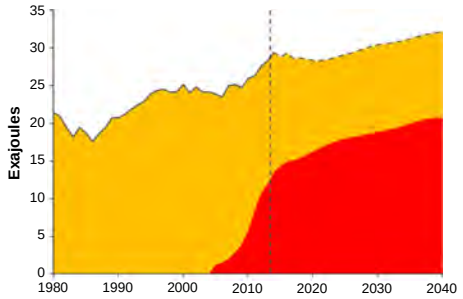


Figure 1 Natural gas production in the USA from 1980 to 2013 and future natural gas production until 2040 as predicted by the US Department of Energy in the *Annual Energy Outlook 2015*.[1] Conventional gas is indicated in yellow, shale gas in red.

shale gas production in the USA is likely to underperform the EIA estimates by almost 40% between now and 2040.[5] However, all these estimates are highly uncertain. If the EIA projections prove true, what might some of the environmental and public health consequences be?

Since shale gas development is a recent phenomenon, scientific investigations on its environmental and public health consequences are also quite new, with the first peer-reviewed studies published only in 2011.[6,7] Nonetheless, the literature has quickly grown, and evidence is accumulating of many adverse effects, including surface and groundwater contamination,[8] degraded air quality,[9,10] increased release of greenhouse gases,[11,12] increased frequency of earthquakes,[13] and evidence of harm to the health of humans and domestic animals, including farm livestock.[7,14–18]

The natural gas industry often points out that hydraulic fracturing has been in use for >60 years, implying that there is little new about shale gas development.[19] The scale of hydraulic fracturing used to develop shale gas, however, is far greater than the fracturing employed in previous decades for conventional gas, with two orders of magnitude increase in the volume of water and chemicals used from the hydraulic fracturing and even proportionally greater return of fracturing wastes to the surface.[6] Further, the use of high-volume hydraulic fracturing with high-precision directional drilling to develop shale gas leads to an intensity of development not generally seen with conventional natural gas and to the redevelopment of regions where conventional gas has largely played out, which may intensify some effects such as air emissions due to interactions with old wells and formations.[20] The appropriate focus when considering the environmental and public health effects of shale gas development is on the entire enterprise and use of the gas and not merely on the process of hydraulic fracturing.

This paper focuses on the role of methane emissions in determining the greenhouse gas footprint of shale gas. Natural gas, including shale gas, is often promoted as a bridge fuel that will allow society to continue to use fossil fuels over the coming decades while reducing carbon emissions. This was highlighted, for example, by President Obama in his State of the Union speech in January 2014.[21] For a given unit of energy consumed, the emissions of carbon dioxide from natural gas are substantially lower than from oil or coal,[11,22] which is the basis for the bridge fuel concept. However, natural gas is composed mostly of methane, a greenhouse gas that on a mass-to-mass basis is >100 times more powerful than carbon dioxide as an agent of global warming for the time when both gases persist in the atmosphere.[23] Consequently, even small releases of methane to the atmosphere from the development and use of shale gas can greatly influence the greenhouse gas footprint of shale gas.

How much methane is emitted?

My coauthors and I published the first peer-reviewed assessment of methane emissions from shale gas development in 2011.[11] We concluded that 3.8% (±2.2%) of the total lifetime production of methane from a conventional gas well is emitted into the atmosphere, considering the full life cycle from well to final consumer.[11] The data available for estimating emissions from shale gas were more scarce and more poorly documented at that time, but we estimated that the full life cycle emissions of shale gas were ~1.5-fold higher than that of conventional natural gas, or 5.8% (±2.2%).[11] We attributed the higher emissions to venting of gas during the flowback period following high-volume hydraulic fracturing, although a subsequent study identified other sources as well, such as drilling through strata previously developed for coal and conventional natural gas.[20] For both conventional gas and shale gas, we estimated the "downstream" emissions associated with storing gas and delivering it to market to be 2.5% (±1.1%), so our estimates for "upstream" emissions at the well site and from gas processing averaged 1.3% for conventional natural gas and 3.3% for shale gas.[11,12]

Through 2010, the US Environmental Protection Agency (EPA) continued to estimate emissions for conventional natural gas as 1.1%, with 0.9% of this from downstream emissions and 0.2% from upstream emissions, based on a joint EPA and industry study from 1996, as I discuss elsewhere.[12]

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They did not separately consider shale gas emissions. Soon after our paper was published in 2011, the EPA released new estimates that were very similar to ours in terms of upstream emissions: 1.6% for conventional natural gas and 3.0% for shale gas.[12] They kept their downstream emission estimates at 0.9%, yielding full life cycle emissions of 2.5% and 3.9%, respectively, for conventional gas and shale gas. EPA subsequently reduced their estimates for upstream emissions, cutting them approximately in half, relying on a non-peer-reviewed industry report[24] asserting that the 2011 estimates had been too high.[12,25] This yielded a full life cycle emission estimate for all natural gas in the USA, considering the contributions from both conventional and shale gas as of 2009, of 1.8%.[12] The inspector general of the EPA has called for improvements in the agency's approach in estimating emissions,[26] at least in part because of the 2013 decision to lower emission estimates.[12,25]

In our original 2011 paper, we called for new and better studies of methane emissions from the natural gas industry,[11] and in fact, many studies have been published in the subsequent 4 years. In 2014, I published a review of the new studies that had come out through February 2014.[12] One of these studies evaluated a large set of data from monitoring stations across the USA for the period 2007–2008, before the large increase in shale gas production, and concluded that the EPA estimate of 1.8% emission was clearly too low by a factor of at least 2 and that full life cycle emissions from conventional natural gas must be ≥3.6% on average across the USA.[27] Other, shorter term studies evaluated upstream emissions from shale gas and other unconventional gas development (ie, tight sands), with two finding high emissions (4%–9%)[25,28] and one published by Allen et al finding low emissions (0.4%).[29] In a summary published in early 2014, Brandt et al concluded that emissions from the natural gas industry, including both conventional gas and shale gas, could best be characterized as averaging 5.4% (±1.8%) for the full life cycle from well to consumer.[30] I accepted that conclusion and presented it as the best value in my 2014 review.[12]

Further thought and subsequent studies published since February 2014 have led me to reconsider. I now believe that emissions from conventional natural gas are somewhat <5.4%, based on the ^{14}C content of atmospheric methane globally, and emissions from shale gas are likely substantially more, based on global trends observed from satellite data and new evidence that the 2013 report by Allen et al of only 0.4% emissions[29] is likely to be flawed.

^{14}C content of methane and emissions from conventional natural gas

The ^{14}C radiocarbon content of methane in the planet's atmosphere provides a constraint on the emission rate from conventional natural gas systems. On average during the years 2000–2005, 30% of atmospheric methane was ^{14}C "dead", indicating that it came from fossil sources.[31,32] During this time period, the total global flux of methane to the atmosphere was probably in the range of 548 (±22) Tg CH_4 per year.[33] Therefore, the flux from fossil sources, 30% of the total flux, would have been ~165 Tg CH_4 per year. These fossil sources include fluxes associated with coal, oil, and natural gas development as well as natural seeps. Using global production data for coal and oil[34] and well-accepted methane emission factors for these two fuels as described elsewhere,[11] I estimate the combined methane emissions from oil and coal as ~50 Tg CH_4 per year. Using the 5.4% emission rate and global natural gas production estimates[34] for the years 2000–2005 yields a methane emission of 130 Tg CH_4 per year from the natural gas industry or 180 Tg CH_4 per year from all fossil fuels. This is too high compared to the ^{14}C constraint, suggesting that an emission rate of 5.4% for conventional gas is too high, even if natural seeps are negligible, as assumed by the Intergovernmental Panel on Climate Change (IPCC) in 2007 in their fourth assessment report.[35] Flux estimates from natural seeps are poorly constrained, but these natural emissions may be as great as 50 Tg CH_4 per year or higher.[31] If we instead use the mean emission factor from our 2011 paper for conventional natural gas of 3.8%,[11] the global flux from natural gas emissions is estimated as 91 Tg CH_4 per year, giving an emission flux from all fossil fuels of ~140 Tg CH_4 per year and an estimate of emissions from natural seeps of 15 Tg CH_4 per year. This combination is plausible, if uncertain, and the 3.8% factor agrees well with the robust conclusion from Miller et al that emissions from conventional natural gas systems in the USA, from before the shale gas boom, must have been at least 3.6% of production.[27]

How high are methane emissions from shale gas?

A paper published by Schneising et al in the fall of 2014 used satellite data to assess global and regional trends in atmospheric methane between 2003 and 2012.[36] Methane concentrations rose dramatically in the northern hemisphere, particularly after 2008. In a detailed comparison across the

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USA for the time periods 2006–2008 (before there was much shale gas or shale oil development) and 2009–2011 (after shale gas and oil production began in earnest), atmospheric methane concentrations rose dramatically in many of the major shale-producing regions. By evaluating trends in drilling and hydraulic fracturing activity, Schneising et al estimated methane emission rates of 9.5% (±7%) in terms of energy content during the 2009–2011 period for the two large shale regions – the Eagle Ford in Texas and the Bakken in North Dakota – where they felt most comfortable in estimating emissions.[36] They reported similar methane emissions for the Marcellus shale, but with much greater uncertainty in the analysis of the satellite data because of sparser spacing of wells, the mountainous terrain, and the proximity of the region to the Great Lakes. For the Bakken, shale oil production was far greater than gas production during this time period,[37] and the methane emissions may have been more associated with the oil production. However, natural gas was the dominant form of shale energy produced in the Eagle Ford formation between 2009 and 2011, contributing 75% of all shale energy with oil contributing 25%.[37] For the Marcellus shale, virtually all shale energy production through 2011 came from shale gas and not oil.[37] Therefore, it seems reasonable to attribute a methane emission rate of ~9.5% to shale gas development in the Eagle Ford and Marcellus formations.

The satellite methane emission estimate is largely for upstream emissions and does not fully account for downstream emissions during storage and delivery of gas to customers, which may on average add another 2.5% of methane emission.[11,12,22] The conclusion is that shale gas development during the 2009–2011 period, on a full life cycle basis including storage and delivery to consumers, may have on average emitted 12% of the methane produced. This is more than twice what we had estimated for shale gas in our 2011 analysis,[11] but the satellite-based estimate is based on more robust data and integrates across a period of 2 years. These shale gas emissions already may have a globally observable effect on methane in the atmosphere.[36]

The satellite-based estimate is ~20-fold greater than the estimate presented by Allen et al,[29] a study that worked closely with industry to measure emissions from various component processes of shale gas development. In my 2014 review, I suggested that the study by Allen et al may represent a best-case scenario for low emissions, given that measurements were made only at sites where industry allowed.[12] Since then, two papers published in 2015 have indicated that in fact the data in the Allen et al's paper may be flawed. Allen et al used a high-flow analyzer that employs two independent sensors, switching between a catalytic oxidation detector when methane levels are low and a thermal conductivity detector when methane concentrations are greater. Howard et al noted that the high-flow analyzer is prone to underestimating methane fluxes when switching between detectors.[38] A follow-up paper by Howard et al carefully evaluated the use of a high-flow analyzer by Allen et al and concluded that "the data reported by Allen et al. (2013) suggest their study was plagued by such sensor failure", and as a result "their study appears to have systematically underestimated emissions."[39] The sensor failure issue may well have affected other data reported by industry to the EPA and used by the EPA in their assessment of methane emissions, leading to serious underestimation.[38,39]

Several other recent studies have estimated upstream methane emissions from shale gas and other unconventional natural gas development (ie, from tight-sand formations) using more robust and more integrated measurement techniques such as airplane flyovers, but still with highly variable results. Estimates were ~30% greater than the satellite-derived data for one gas field,[40] were comparable in two other cases,[20,25] were only about half as much for two sets of measurements in another gas field,[28,41] and were substantially less in three other cases.[40] Peischl et al have suggested that higher emissions are associated with wet-gas fields and lower emissions with dry-gas fields.[40] Alternatively, the variation in emissions may simply reflect variance in space and/or in time: many of these studies were quite short in duration, for example, based on measurements made during airplane flyovers of just 1–2 days.[20,40] It is also important to note that these emission estimates are given as percentages of the gas production rates. The activity of the natural gas industry and rates of production in various gas fields are quite variable in time, and some of the differences in percentage emission rates may reflect this variability. For instance, Caulton et al reported high emission rates in the southwestern Pennsylvania portion of the Marcellus shale based on a June 2012 flyover,[20] while Peischl et al reported a very low percentage of emission rate in the northeastern Pennsylvania portion of the Marcellus shale from a July 2013 flyover.[40] Between these two flights, gas drilling activity for shale gas fell by 64% due to low prices for gas,[42] yet shale gas production remained high based on prior drilling and hydraulic fracturing.[1] If methane emission is more related to drilling and hydraulic fracturing activity than to production, these rapid changes in activity may explain at least part of the differences between the two estimates for Marcellus shale.

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I therefore conclude that the satellite data[36] provide the most robust estimates for upstream methane emissions from shale gas operations to date.

Is natural gas a bridge fuel?

Natural gas is widely promoted as a bridge fuel, a source of energy that allows society to continue to use fossil fuels while reducing greenhouse gas emissions over the next 2 decades or so, until renewable energy sources can more fully come on line. Our 2011 paper challenged that view because of methane emissions from natural gas, although we tempered our conclusion because of the uncertainty in methane emissions from shale gas development.[11] We also observed that the time frame over which one compares the consequences of emissions of carbon dioxide and methane is important in determining the overall greenhouse gas footprint of natural gas. While many studies have made this comparison only by averaging the radiative forcing of the two gases over a time of 100 years following emission, we compared on a 20-year timescale as well, following the lead of Hayhoe et al[22] and Lelieveld et al.[43] Methane has a residence time in the atmosphere of only 12 years,[23,33] while the influence of carbon dioxide emissions persists in the atmosphere for many hundreds of years or longer.[23] While both gases are in the atmosphere, the greenhouse warming effects of methane are >100-fold greater than for carbon dioxide on a mass-to-mass basis.[23] When compared on a 100-year average time after emission, the emitted methane is largely absent from the atmosphere for almost 90% of that time, which greatly underplays the importance of methane while it is in the atmosphere.

Our 2011 paper was criticized for comparing the consequences of methane and carbon dioxide over a 20-year period in addition to the 100-year period, with some authors stating that only a 100-year period should be used under the guidance of the IPCC.[44,45] This was never the case, and in the fourth synthesis report in 2007, the IPCC presented analyses based on both 20- and 100-year time periods.[35] Further, in the fifth synthesis report in 2013, the IPCC explicitly weighed in on this controversy, stating that "there is no scientific argument for selecting 100 years compared with other choices", and "the choice of time horizon […] depends on the relative weight assigned to the effects at different times".[23]

So what is the best choice of timescale? Given current emissions of greenhouse gases, the Earth is predicted to warm by 1.5°C above the preindustrial baseline within the next 15 years and by 2°C within the next 35 years.[46,47] Not only will the damage caused by global warming increase markedly but also at these temperatures, the risk of fundamentally altering the climate system of the planet becomes much greater.[48,49] Further, reducing emissions of carbon dioxide will do little if anything to slow the rate of global warming over these decadal time periods.[47] On the other hand, reducing emissions of methane has an immediate effect of slowing the rate of global warming.[47] For these reasons, comparing the global warming consequences of methane and carbon dioxide over relatively short time periods is critical. The use of a global warming potential (GWP) estimate for the 20-year time period from the IPCC fifth assessment report provides a convenient approach for doing so.[23] This GWP value of 86 is the relative radiative forcing for methane compared to that of carbon dioxide, averaged over 20 years, for two equal masses of the gases emitted into the atmosphere today.

Figure 2 compares the greenhouse gas footprint of shale gas with that of conventional natural gas, oil, and coal. Methane emissions of shale gas are derived from the satellite-based estimates of Schneising et al[36] with an additional 2.5% emission rate assumed from downstream transport, storage, and distribution systems.[11,12,22] Methane emissions for the other fuels are those used in our 2011 paper, which is 3.8% (±2.2%) for conventional natural gas.[11] Methane emissions are converted to carbon dioxide equivalents using the 20-year GWP value of 86 from the IPCC assessment.[23] While for a

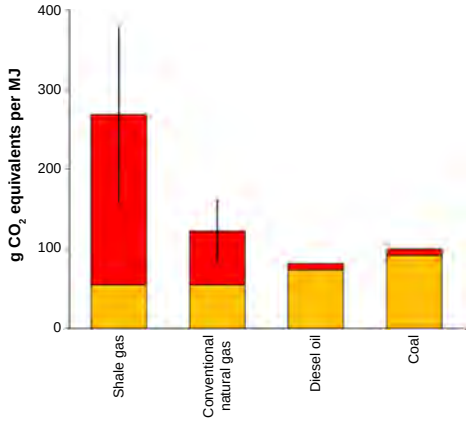


Figure 2 The greenhouse gas footprints of shale gas, conventional natural gas, oil, and coal expressed as g CO_2 equivalents per MJ of heat produced.
Notes: Yellow indicates direct and indirect emissions of carbon dioxide. Red indicates methane emissions expressed as CO_2 equivalents using a global warming potential of 86. Vertical lines for shale gas and conventional natural gas indicate the range of likely methane emissions. Emissions for carbon dioxide for all fuels and for methane from conventional natural gas, oil, and coal are as in Howarth et al.[11] Mean methane emission estimate of shale gas is taken as 12% based on Schneising et al[36] as discussed in the text.

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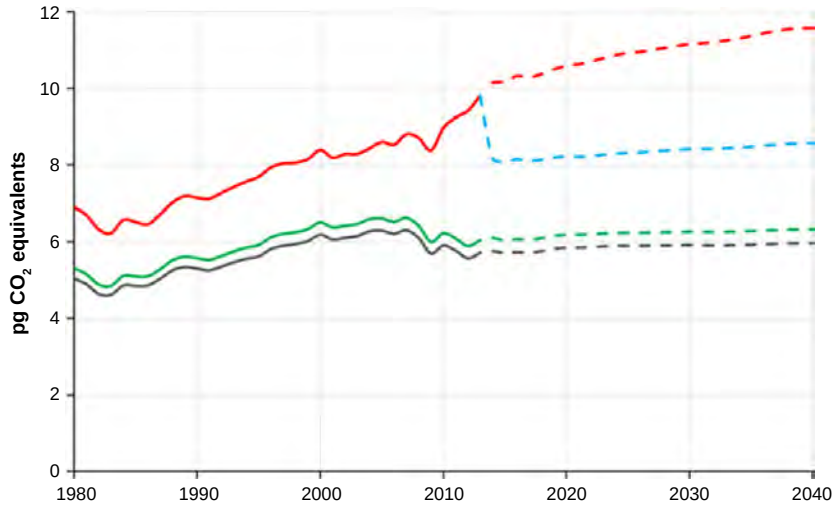


Figure 3 Trends in greenhouse gas emissions from fossil fuel use in the USA from 1980 to 2013 and future trends predicted until 2040 based on historical energy use and energy predictions in the *Annual Energy Outlook 2015*.[1] Shown are: emissions just for carbon dioxide (gray line); emissions for carbon dioxide and for methane using EPA assumptions, which undervalue the importance of methane (green line); emissions for carbon dioxide and methane based on emission factors for conventional natural gas, oil, and coal from Howarth et al,[11] mean methane emission estimates for shale gas of 12% based on Schneising et al[36] as discussed in the text, and a global warming potential for methane of 86 (red line); and future emissions for carbon dioxide and methane based on the same assumptions as for the red line, except assuming that shale gas emissions can be brought down to the level for conventional natural gas (blue line). Historical data are shown by solid lines; dashed lines represent future predictions.
Abbreviation: EPA, Environmental Protection Agency.

given unit of energy produced, carbon dioxide emissions are less for shale gas and conventional natural gas than those for oil and coal, the total greenhouse gas footprint of shale gas is substantially greater than that of the other fossil fuels when methane emissions are included (Figure 2). Note that this is true even for the low-end estimates of methane emissions from the Schneising et al study. The greenhouse gas footprint of conventional natural gas is also higher than that of conventional oil and coal for the mean estimate of methane emissions and still greater than or comparable to that of these other fuels even at the low-end estimate for methane emissions. Natural gas – and shale gas in particular – is not a bridge fuel when methane emissions are considered over an appropriate timescale.

Trends in greenhouse gas emissions from fossil fuels in the USA

Figure 3 shows the greenhouse gas emissions from all use of fossil fuels in the USA from 1980 to 2013 and projections for emissions through 2040, based on data for fossil fuel use and projections of future use from the EIA *Annual Energy Outlook 2015* report[1] and carbon dioxide emissions per unit of energy produced for each fuel.[11,22] Total carbon dioxide emissions fell in the early 1980s due to economic recession, but as the economy recovered, emissions rose steadily until the great recession of 2008. Carbon dioxide emissions continued to fall from 2008 to 2013 and are predicted to remain relatively flat through 2040.[1] President Obama and others have attributed the decrease in carbon dioxide emissions since 2008 to a switch from coal to shale gas,[21,50] although a recent analysis by Feng et al concludes that the sluggish economy was the more significant cause.[51]

When methane emissions are included in the analysis, we see some important differences in trends in national greenhouse gases. For the top line in Figure 3, methane emissions are included as carbon dioxide equivalents using the 20-year GWP of 86 from the IPCC fifth assessment[23] and methane emission factors from the 2011 study by Howarth et al[11] for coal, conventional oil, and conventional natural gas and a factor of 12% based on the satellite data discussed earlier for shale gas. In this analysis, methane contributes 28% of total fossil fuel emissions for the USA in 1980 and 42% in 2013 (Figure 3). The increasing trend in the relative importance of methane in the greenhouse gas emissions of the USA is due to

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an increasingly large portion of the nation's fuel mix coming from natural gas and particularly from shale gas for the time since 2009.[1] Shale gas production was negligible before 2005 (Figure 1) but rose to contribute 14% of all fossil fuel energy used in the USA in 2013.[1] Importantly, while carbon dioxide emissions fell between 2008 and 2013, total greenhouse gas emissions including methane fell only briefly in 2008 before beginning a rapid increase that lasted through 2013 and are projected to continue to rise through 2040.

The US EPA includes methane emissions in the natural gas inventory, but they do so in a manner that greatly undervalues their importance. This can be seen in Figure 3, where the green line that is just above and closely tracks the gray line for carbon dioxide emissions is based on EPA assumptions: a methane emissions rate of only 1.8% from natural gas and a GWP of 21 based on the 100-year time period from the second IPCC assessment from 1996.[52] Note that the EPA used this GWP value of 21 for many years, through 2013, before switching to the 100-year value of 25 in 2014 from the IPCC fourth assessment from 2007. The 2013 assessment of the IPCC gives a GWP value of 34 for the 100-year period but, as noted earlier, also states that the 100-year time frame is arbitrary. A shorter time frame, such as the 20-year GWP of 86 used in the top line in Figure 3, far better accounts for the importance of methane to global warming in the critical next few decades as the temperature is predicted to reach 1.5°C–2°C above the preindustrial baseline if methane emissions are not reduced.

Implications for policy on shale gas

As of January 2015, the US EPA has taken some steps to reduce emissions from shale gas, but how effective these will be in reducing methane emissions remains unclear. A draft regulation proposed in 2012 would have prevented the venting of methane during the flowback period following hydraulic fracturing, with some exceptions such as for wells in frontier regions not yet serviced by pipelines.[53] This would be important, since such venting can emit a large amount of methane.[11] However, the final regulation distinguishes between two phases of flowback, an "initial flowback stage" and a "separation flowback stage". Venting of methane and other gas is explicitly allowed during the initial stage, and recovery of the gas is only required during the separation stage.[53] The separation stage is supposed to commence as soon as it is technically feasible to use a flowback gas separator. At this stage, EPA requires that the gas be sold to market, reinjected into the ground, used as an onsite fuel, or, if none of these are possible, flared (ie, burned). No direct venting of gas is allowed during this separation flowback stage, "except when combustion creates a fire or safety hazard or can damage tundra, permafrost or waterways".[53] Much is left to operator judgment as to when the shift from the initial stage to the separation stage occurs and whether an exception is necessary, which would seem to make enforcement of these regulations difficult.

Further, EPA continues to ignore some methane emission sources, such as during the drilling phase. Caulton et al identified many wells that were emitting high levels of methane during this drilling phase, before the drillers had even reached the target shale, and long before hydraulic fracturing,[20] perhaps because drillers were encountering pockets of methane gas from abandoned conventional gas wells or abandoned coal mines. Our understanding of emission sources remains uncertain, with the study of shale gas methane emissions commencing only in the past few years.[6] Adequate regulation to reduce emissions requires better knowledge of sources, as well as better oversight and enforcement.

Nonetheless, methane emissions from shale gas can be reduced to some extent. I suggest that the best-case scenario would have these emissions reduced to the level for conventional natural gas, or ~3.8% for the full well-to-consumer life cycle. This best-case scenario is explored in Figure 3 (dashed blue line), where it is assumed that shale gas methane emissions are reduced from 12% to 3.8% as of 2014. Even still, methane accounts for 30% of total greenhouse gas emissions from fossil fuels in the USA throughout the period from 2014 to 2040 under this scenario, and total emissions continue to rise, albeit more slowly than without the aggressive reduction in shale gas methane emissions. This best-case scenario seems unlikely, and actual emissions from shale gas are likely to range between 3.8% and 12%, giving total greenhouse gas emissions for all fossil fuels that lie between the dashed red and blue lines in Figure 3.

Methane emissions severely undercut the idea that shale gas can serve as a bridge fuel over the coming decades, and we should reduce our dependence on natural gas as quickly as possible. One of the most cost-effective ways to do so is to replace in-building use of natural gas for domestic space and water heating with high-efficiency heat pumps. Even if the electricity that drives these heat pumps comes from coal, the greenhouse gas emissions are far less than from the direct use of natural gas.[12] Heating is the major use for natural gas in the USA, making this change of use imperative.

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Concluding thoughts and a path forward

Should society continue to use coal rather than convert toward more electricity production from shale gas? Absolutely not. The carbon dioxide emissions from burning any fossil fuel will continue to influence the climate for hundreds of years into the future, and coal is the worst of the fossil fuels in terms of carbon dioxide emissions. Given the imperative of also reducing methane emissions to slow global warming over the coming few decades, though, the only path forward is to reduce the use of all fossil fuels as quickly as possible. There is no bridge fuel, and switching from coal to shale gas is accelerating rather than slowing global warming.

Fortunately, society does have a path forward: recent studies for the State of New York[54] and for the State of California[55] have demonstrated that we can move from a fossil fuel-driven economy to one driven totally by renewable energy sources (largely solar and wind) in a cost-effective way using only technologies that are commercially available today. The major part of the transition can be made within the next 15 years, largely negating the need for shale gas, with a complete transition possible by 2050. A critical part of these plans is to use modern, efficient technologies such as heat pumps and electric vehicles, which greatly reduce the overall use of energy. The cost of the transition is less than the cost currently paid for death and illness related to air pollution from using fossil fuels.[54] The costs of renewable energy today are equal to or lower than those from using fossil fuels, when the external costs to health and the climate are considered.

In June 2015, six of the largest oil and gas companies in Europe including BP and Shell called for a carbon tax as a way to slow global warming.[56] An editorial in the *New York Times* endorsed this idea,[56] and indeed, a carbon tax is perhaps the best way to equalize the playing field for renewable energy technologies. The International Monetary Fund estimates that subsidies to fossil fuels globally are in the range of $5 trillion per year, with much of this due to the effects of global warming and consequences on human health.[57] A carbon tax would help rectify these subsidies and help promote renewable energy. However, the editorial in the *Times* made a fundamental error by ignoring methane emissions when they wrote "this tax would reduce demand for high-carbon emission fuels and increase demand for lower emission fuels like natural gas".[56]

Any carbon tax should recognize the two faces of carbon: the two major greenhouse gases, carbon dioxide and methane, are both carbon gases. Both of these carbon gases are critically important, and the 2013 IPCC synthesis report tells us that the effects of global methane being emitted today matches the consequences of carbon dioxide emissions as drivers of global warming.[23] The modes of interaction with the planetary climate system are dramatically different, though. The climate is slow to respond to changes in carbon dioxide emissions, and so immediate reductions in emissions would take 30–40 years before having an influence on slowing warming, but the emissions have a warming effect on the climate that will persist for hundreds of years.[23,46,47] The climate responds quickly to changes in methane emissions, and reducing methane emissions is essential for slowing climate change over the coming 30–40 years; however, the methane remains in the atmosphere for little more than 1 decade, and methane emissions have no lasting influence on the Earth's climate systems in future centuries, unless global warming over the coming decades leads to fundamental thresholds and changes in the climate.[12,23,46,47]

A carbon tax that adequately addresses the immediacy of global climate change must include both carbon gases. Methane emissions should be taxed using the best available information on methane emissions. And the tax on methane should adequately reflect the importance of methane in current global warming and its influence in global warming over the critically important next few decades. Taxing methane emissions at 86 times the tax for carbon dioxide emissions, using the 20-year GWP from the most recent IPCC synthesis report,[23] would accomplish this.

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Disclosure

The author reports no conflicts of interest in this work.

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Steve: Thank you. Mary Paterson?

Mary: Yeah, thanks. I'm Mary Patterson. I'm a settler from the Lake City neighborhood in Seattle. I'm Scottish, Irish, English descent. And I want to make these comments, in honor of my grandfather who was a coal miner's son in the lowlands of Scotland more than 100 years ago and who never knew his father because his father was one of the casualties of fossil fuel, in that era. He was killed in a coal mine. Two points, in addition to all of the great, beautiful statements that people have offered. One is that the ships and the shipping industry does not need liquified natural gas to meet the emission standards that they face.

[03:31:05] In 2015, *Tacoma Herald Tribune*, I believe, has an article on the Horizon Matson Line, meeting of standards by using sulfur scrubbers that they purchased from the Netherlands. The International Maritime Organization, I think, is the body that has published a 30 page report that includes recommendations of wind assistance as well as sleeker ship designs and a host of others that would meet those emission standards without using liquified natural gas. Second and last point is that methane leakage is the huge issue.

I want to, when I submit my written comments, point to the methane project out of Cornell University, Robert Haworth's work there, I believe. And also, NOAA's, National Oceanic Atmospheric Administration, work measuring leakage rates well about the three percent threshold that would make liquified natural gas, aka methane, as bad as coal.

[03:32:11] Well above. In the Denver basin, four percent. In Utah, 11%. In California LA basin, 17%, otherwise known as death by 1,000 cuts. So, I urge you to reject the drafted SEIS and get some real facts to work with. Thank you.

1187-1 7. SEPA Alternatives
1187-2 14. LCA Inputs and Assumptions - Leakage/Slippage

0351-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

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All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Eric PAULSEN

Address or email 8012 E B ST, TACOMA, WA

LNG Plant in Tacoma is bad for our children, bad for safety, bad for the tribes, bad for citizens. I DO NOT WANT more pollution, more danger that is represented by this facility being built

NO ON LNG

IN TACOMA

Carole: Thank you. Mary Paynter?

[01:58:00]

Mary: Thank you. My name is Mary Paynter. I live in Des Moines, not very far from here. And I'm pretty much discarding all of the notes that I carefully pre-wrote because it's all been said. But I do want to say I'm a veteran. Not a military veteran, but a veteran of these kinds of hearings. So, when I was sitting down to draft my comments for today, I had a preconceived notion that I would be totally against this LNG facility because I'm always testifying against fossil fuel facilities and export terminals and the like. But then, I kept running across the statement that replacing bunkered diesel fuel with LNG would reduce greenhouse gases.
And I thought so now what do I do. And I kept having this image. I think I've watched too many commercials for clean, natural gas. But I had this image of a little, blue flame replacing this ugly, oily diesel.

[01:59:06] And I thought, gosh, that seems good. Well, maybe ships can be electrified. So, I did a little research on that. And it turns out yeah, ferry boats, we can skip over LNG and go straight to electrification for them, short hops, but not really for trans ocean types journeys. So, but then, I go back to the bottom line. And this is really the crux of my argument is that, if you use the right numbers, this build option is dirtier than the no build option. So, we can't do what the gentleman that was up here before me just said. We've got to do something. No, we've got to do something that's the right thing to do.

And building this is not the right thing to do. Building the heroin dispensary is not the right thing to do. So, let's solve this problem of ships and their black spewing smoke stacks. Yeah. We have to solve it. I'm not a scientist or an engineer.

[02:00:00] And I can't do it. But this is not the answer, not if we use the right data. Thank you.

From: Mary Paynter
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 5:51:30 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

You must be quite tired of reading letters, especially form letters. I will sum up: The numbers lie. You must deny!

Sincerely,

Mary Paynter

Mary Paynter
paymentmary@comcast.net
27220 10th Avenue South
Des Moines, Washington 98198

2240-1 22. General Opposition
2240-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2240-4 10. LCA Calculations
2240-4 13. LCA Inputs and Assumptions - Natural Gas Source

From: Mary Paynter
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Tuesday, November 20, 2018 12:05:17 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I live in Des Moines, about 16 miles from the proposed LNG facility.

It is tempting to believe that "natural" gas is cleaner than diesel and that replacing marine diesel with methane is an appropriate "bridge" to eventual electrification of ocean-going vessels. But it's just not true, when methane leaks, the extraction process, and the methane released during operation of the plant are taken into account. And if it's not true, that means the No Action alternative is better and cleaner than completing this LNG facility. The fact that this SEIS uses a 100-year measure for methane, when the plant's life span is 40 years, makes me question the whole document.

There are other issues with the SEIS: missing data, and no method of assuring the gas will come from BC.

The latest IPCC report is scarily clear. We are on the brink of an unthinkable, unprecedented global catastrophe. We are in an extremely deep hole and we must stop digging.

I'm 74. I have granddaughters. I want them to grow up in a world with glaciers and coral reefs and breathable air.

I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Thank you. Sincerely,

Mary Paynter

Mary Paynter
payntermary@comcast.net
27220 10th Avenue South
Des Moines, Washington 98198

1291-1 13. LCA Inputs and Assumptions - Natural Gas Source
1291-2 13. LCA Inputs and Assumptions - Natural Gas Source
1291-3 13. LCA Inputs and Assumptions - Natural Gas Source

From: Valarie Peaphon
To: Public Comment
Subject: Public comment on Tacoma LNG Project
Date: Monday, November 19, 2018 6:46:01 PM
Attachments: Val documents lng 1.pdf
Val documents lng 2.pdf
Val documents lng 3.pdf
Val documents lng 4.pdf
Val documents lng.pdf

November 19, 2018

To Whom It May Concern:

The Puget Sound Clean Air Agency is relying on a risky make-or-break assumption that the Tacoma LNG Project will ***only*** be supplied natural gas from British Columbia (BC). Is this based on PSE's word? How is it guaranteed/proven/enforced? I believe this assumption/expectation to be false.

Also, why do you accept the assertion that natural gas from BC is cleaner? Is this rooted in scientific evidence or based on self-reports from industry? "According to Natural Resources Canada, about 50 percent of Canadian gas was derived from fracking in 2014, and the figure is expected to increase to 80 percent by 2035." (Powell, Tarika. *Is Your "Natural" Gas Actually Fracked*? Sightline Institute. Web. 30 October 2017. www.sightline.org.)

Please consider PSE will say anything to get their LNG project approved.

On PSE's own website, www.tacomacleanlng.com, they have said many things on the subject. Below are excerpts from PSE materials and website content over time (see attachments):

Originally in PSE's FAQ piece they stated half of their gas comes from the United States:

> **Q: "**Does PSE produce natural gas?"
> **A:** "No, we purchase 100 percent of the natural gas supplies needed to serve our customers. About half the gas comes from British Columbia and Alberta and the rest comes from the Rocky Mountain states."
> **Q:** "Do you buy gas that has been fracked?"
> **A:** "About 50 percent of the natural gas in the US comes from hydraulic fracturing (fracking). While the debate regarding its effect on the environment will continue, we support rules and regulations that ensure safety and protection of ground water during the drilling of natural gas."

Then, as PSE started to receive pushback regarding the environmental

1291-3 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1291-4 13. LCA Inputs and Assumptions - Natural Gas Source

degradation caused by fracking they revised their messaging to highlight horizontal drilling as an alternative yet they continued to say they get their gas from both Canada and the United States:

> **Q:** "Where does PSE get the natural gas for this facility?"
> **A:** "PSE has no natural gas wells of its own. We buy 100 percent of our natural gas, either from Canada or Rocky Mountain states. We are a local natural gas distribution company that supplies gas within the State of Washington. Fracking – hydraulic fracturing- has been employed by the natural gas industry for many years, though with the advancement of horizontal drilling technology, new supplies of natural gas are available for recovery."

Next, PSE starts to omit what extraction method will be used altogether but again maintains they get their gas from both Canada and the United States:

> **Q:** "Where does PSE get the natural gas for this facility?"
> **A:** "As a local gas distribution company, PSE provides natural gas to 800,000 customers throughout western Washington. We have no natural gas wells of our own. We buy 100 percent of our natural gas, either from Canada or the Rocky Mountain states."

Now, conveniently, PSE reports:

> **Q:** "Does PSE produce natural gas?"
> **A:** "No, we purchase 100 percent of the natural gas supplies needed to serve our customers. All gas for this facility will be brought from British Columbia, Canada."

The DSEIS's conclusion there will be an overall decrease in greenhouse gas (GHG) emissions relies on the sole source of natural gas coming from BC. If PSCAA were to abandon that assumption, would there still be a net reduction of GHG emissions? PSCAA should run the numbers showing other likely outcomes if something less than 100% of the gas were to come from BC. What if that number is reduced to 75%, 50%, or even 25%?

The Tacoma LNG Project should not be granted a NOC order of approval. The Puget Sound Clean Air Agency's DSEIS on the proposed Tacoma LNG project is unacceptable. If the permit is not denied outright, I am requesting you conduct a new study figuring that natural gas will come from a variety of locations. Once that is complete, please open another public comment period.

Our air is not for sale. Our health and safety and the sustainability of this planet is at stake. Don't gamble our future and lose on an erroneous assumption.

Sincerely,

Valarie Peaphon

Resident of Tacoma

Natural Gas Pipelines

What material is used for gas pipelines?

How large is PSE's natural gas pipeline system?

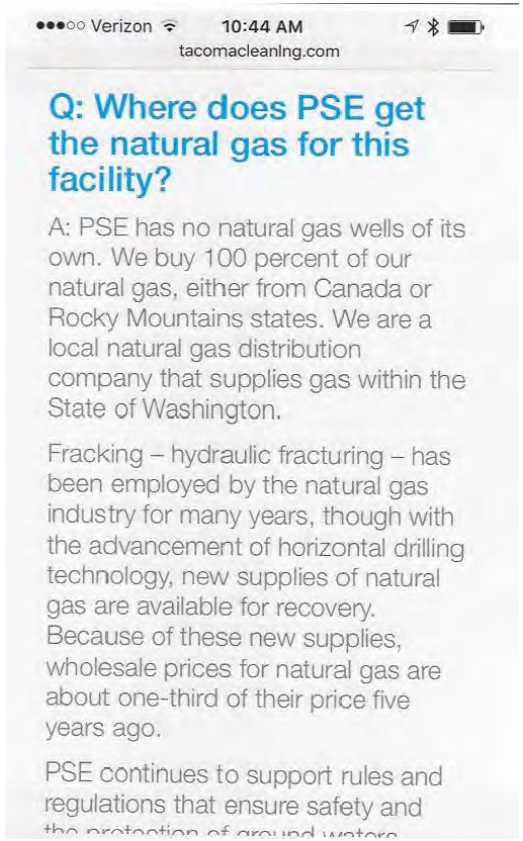
What kind of maintenance is performed on PSE pipelines?

Are gas pipelines pressurized?

Does PSE produce natural gas?

Do you buy gas that has been fracked?

About 50 percent of the natural gas in the US comes from hydraulic fracturing (fracking). While the debate regarding its effect on the environment will continue, we support rules and regulations that ensure safety and protection of ground water during the drilling of natural gas.


●●●○○ Verizon 10:44 AM
tacomacleanlng.com
Q: Where does PSE get the natural gas for this facility?
A: PSE has no natural gas wells of its own. We buy 100 percent of our natural gas, either from Canada or Rocky Mountains states. We are a local natural gas distribution company that supplies gas within the State of Washington.
Fracking – hydraulic fracturing – has been employed by the natural gas industry for many years, though with the advancement of horizontal drilling technology, new supplies of natural gas are available for recovery. Because of these new supplies, wholesale prices for natural gas are about one-third of their price five years ago.
PSE continues to support rules and regulations that ensure safety and

Q: What is a peak shaving facility?

A: Peak shaving means that PSE will have dependable and cost-effective natural gas to serve local customers on the coldest days of the year. PSE requires 6 of the 8 million gallons of storage for the peak shaving function; the rest will serve transportation customers.

Q: How much will the facility cost to build?

A: We expect PSE's total investment in the project to be between $275 and $300 million.

Q: Will it be as bright as daylight when working at night?

A: No. All outdoor lighting will have hoods to protect the light, down and avoid any skyward illumination. There are no special requirements that would make it any brighter than any other port facility.

Q: How many jobs will be created at the facility?

A: Hundreds of family-wage jobs will be created, both directly and indirectly.

- 250+ construction jobs on site
- 300+ indirect jobs generated by associated economic activity of construction
- 125 jobs through economic activity once the facility is operational
- 18 jobs at the facility

In addition, the PSE LNG facility will generate millions of dollars in tax revenue for local schools, city services including fire safety and roads, and other state and local government services.

Q: What role does the Port of Tacoma play in approving the facility or overseeing its operations?

A: PSE is leasing land for the facility from the Port of Tacoma. Its ongoing role will be to ensure that PSE complies with the terms of the lease agreement.

Q: How much experience does PSE have with LNG?

A: In addition to providing natural gas service to some 800,000 customers throughout Western Washington, PSE has owned and operated an LNG storage facility used for peak shaving in Gig Harbor for more than a decade.

Q: Does PSE need to make any upgrades to its gas system in the surrounding area to support this facility?

A: Yes. Approximately 5 miles of new natural gas pipeline and related infrastructure will be built to support this project, mostly in the Port of Tacoma. For comparison, we own, operate, and maintain 3,315 miles of gas main in Pierce County and more than 21,000 miles within our service territory.

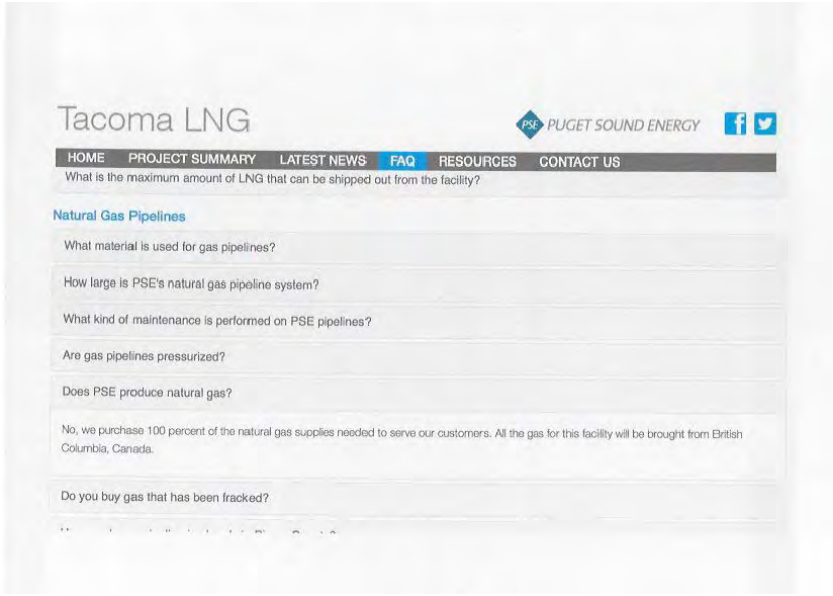
Q: Where does PSE get the natural gas for this facility?

A: As a local natural gas distribution company, PSE provides natural gas to 800,000 customers throughout western Washington. We have no natural gas wells of our own. We buy 100 percent of our natural gas, either from Canada or the Rocky Mountain states.

Q: Why is PSE advertising online and in the newspaper about the LNG facility?

A: Our recent efforts to educate and inform our customers and neighbors about the Tacoma LNG project are the direct result of recently emerging confusion and misinformation about the project. We want to set the record straight as to what the facility will and will not be, the actual properties of LNG, its difference from methanol and its use as a clean, cost-effective marine fuel.

tacomacleaning.com



Tacoma LNG

PUGET SOUND ENERGY

HOME PROJECT SUMMARY LATEST NEWS FAQ RESOURCES CONTACT US

What is the maximum amount of LNG that can be shipped out from the facility?

Natural Gas Pipelines

What material is used for gas pipelines?

How large is PSE's natural gas pipeline system?

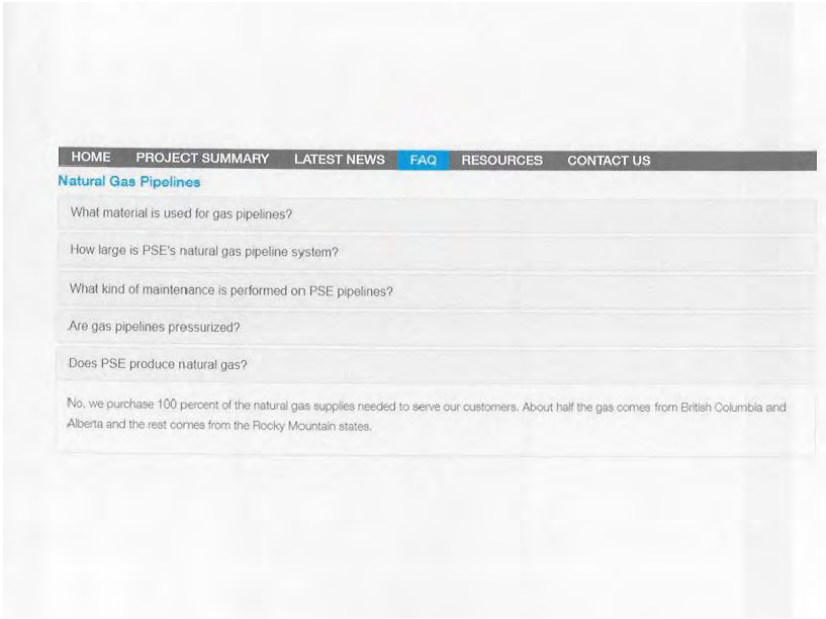
What kind of maintenance is performed on PSE pipelines?

Are gas pipelines pressurized?

Does PSE produce natural gas?

No, we purchase 100 percent of the natural gas supplies needed to serve our customers. All the gas for this facility will be brought from British Columbia, Canada.

Do you buy gas that has been fracked?



HOME PROJECT SUMMARY LATEST NEWS FAQ RESOURCES CONTACT US

Natural Gas Pipelines

What material is used for gas pipelines?

How large is PSE's natural gas pipeline system?

What kind of maintenance is performed on PSE pipelines?

Are gas pipelines pressurized?

Does PSE produce natural gas?

No, we purchase 100 percent of the natural gas supplies needed to serve our customers. About half the gas comes from British Columbia and Alberta and the rest comes from the Rocky Mountain states.

1809-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Valarie Peaphon
To: Public Comment
Subject: Re: Public comment on Tacoma LNG project
Date: Monday, November 19, 2018 6:48:00 PM

To Whom It May Concern:

The Puget Sound Clean Air Agency's DSEIS on the proposed Tacoma LNG project is unacceptable because it uses outdated research from 2007 when weighing the lifecycle analysis of greenhouse gas emissions. If you had cancer would you opt to take the medication doctor's prescribed a decade ago or would you want to have the most updated and relevant medication (science) available?

It does not make sense to look at a 100-year timeframe for multiple reasons:

1. **Scientists report methane is most potent during its first 20 years in the atmosphere.**
2. **In a recent report just released in October of 2018, the UN Intergovernmental Panel on Climate Change (IPCC) warned the next 12 years are most critical in limiting climate change catastrophe.**
3. **PSE's lease with the Port of Tacoma is for 25-50 years. We should be looking at that same time frame.**

PSCAA must measure the effects of emissions over a shorter time frame. I am requesting you conduct another study using newer, more applicable science. Once that is complete, open another public comment period. This is too important to get wrong.

Respectfully,
Valarie Peaphon

Mahoney, Melisa

From: Valarie Peaphon <vpeaphon@aol.com>
Sent: Monday, November 19, 2018 6:47 PM
To: Public Comment
Subject: Tacoma LNG facility

1826-1 5. Regulatory Framework
1826-2 3. Outside of SEIS Scope
1826-3 3. Outside of SEIS Scope
1826-4 11. LCA Inputs and Assumptions - General
1826-5 3. Outside of SEIS Scope
1826-6 21. LCA Inputs and Assumptions - Additional Air Pollutants
1826-7 3. Outside of SEIS Scope

To Whom It May Concern at PSCAA:

The Puyallup Tribe does not want PSE's proposed LNG facility on their land. Full stop. That should be all the information you need. It is imperative you listen to and respect the decisions of the sovereign Puyallup Nation. Indigenous people have been stewards of this land for millennia. This project should have never been allowed to move forward as it is situated on their usual and accustomed tribal gathering and fishing grounds protected by the Medicine Creek Treaty. The very siting of this LNG facility is the textbook definition of environmental racism. It puts both the Puyallup Tribe and the detainees at the ICE detention center at terrible risk.

Protecting the climate is as an absolute necessity for planet survival and the LNG facility poses a very real danger to all living things along the Salish Sea.

1. **If the LNG facility becomes operational, how will the 24/7 output of toxic emissions impact local air quality?**
2. **In addition to the particulate matter, please review the volatile organic compounds and toxic air pollutants in a comprehensive and meaningful way.**
3. **What will the cumulative effect be when you add those pollutants emitted by the LNG facility with others emitted by already existing industry at the Port?**
4. **We cannot look at these emissions in a vacuum. Unfortunately, when we breathe the local air, we do not have the ability selectively inhale the toxins released from Schnitzer Steel or U.S. Oil or WestRock or Targa one at a time. All hazardous emissions mix and mingle to create the cocktail we have no choice but to breathe in.**
5. **Can you monitor the air in real time? Having industry self-report is unreliable. How many people incorrectly self-report their weight on their driver's license? How many people incorrectly self-report how many times they floss their teeth a day?**
6. **How will the additional amounts of Ammonia, Arsenic, Benzene, Cadium, Carbon, GHG, Hydrogen Sulfide, Sulfur Dioxide, and Toluene impact the air?**
7. **When the air is looked at in a cumulative and comprehensive way, how does it impact human health? How does it impact the ozone? How does sit impact the waters of the Salish Sea? How does it impact orca and salmon?**

I am requesting you conduct a new study looking at cumulative effects. Once that is complete, open another public comment period.

Sincerely,

Valarie Peaphon

Resident of Tacoma

Steve: Okay. Is Valarie Peaphon here?

[04:21:00] Am I saying that right?

Valarie: Hi. My name is Valarie Peaphon. I am a resident of Tacoma and a volunteer with the grass roots environmental group, Redefine Tacoma. I support and agree with the Puyallup Tribe in opposing the Tacoma LNG project. And I believe the draft SEIS is inadequate and obviously flawed. I incorporate, by reference, the tribe's previously made comments. Liquified natural gas is natural gas is fracked gas is methane gas. Let's call it what it is. Anyone saying this fossil fuel is the future is dead wrong. PSE has a 25 to 50 year lease, yet Puget Sound Clean Air Agency is evaluating the greenhouse gas emissions over a 100 year cycle.

This dilutes the true impact the methane gas will have in accelerating climate change. I urge you to reissue a new document using the 20 year values.

[04:22:00] Let's use the actual science available. Methane is at least 86 times more potent than carbon, in its first 20 years in the atmosphere. We are at a tipping point. I am deeply concerned about the future livability of the planet. Please give me hope. No permits for LNG, not now, not ever. Tonight, you have heard from tribal members, clergy members, scientists, professors, and doctors all opposed to the LNG project. Only labor reps and paid industry talking heads have supported it. When you know better, you do better. I have two words for the Puget Sound Clean Air Agency, do better.

1232-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

2548-1 22. General Opposition
2548-2 3. Outside of SEIS Scope
2548-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2548-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2548-5 7. SEPA Alternatives
2548-6 7. SEPA Alternatives

From: sondra@everyactioncustom.com on behalf of Sondra Pearlman
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:44:05 AM

Dear Responsible Official,

I oppose this action because a fraked gas hub is extremely dangerous. It will cause great havoc when it explodes. Do not do this. Protect our safety

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Sondra Pearlman
Portland, OR 97239
sondra@pearlmanoffice.com

1866-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

This is a direct threat to the Puyallup tribe. It will raise methane by 3% & the communities most directly impacted have strongly opposed this pipeline.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Anissa Pemberton Email: anissa350pdx@gmail.com

Address: 5605 SE Francis St, Portland OR 97219

By completing this comment card you agree to receive updates about the project.

0651-1 22. General Opposition

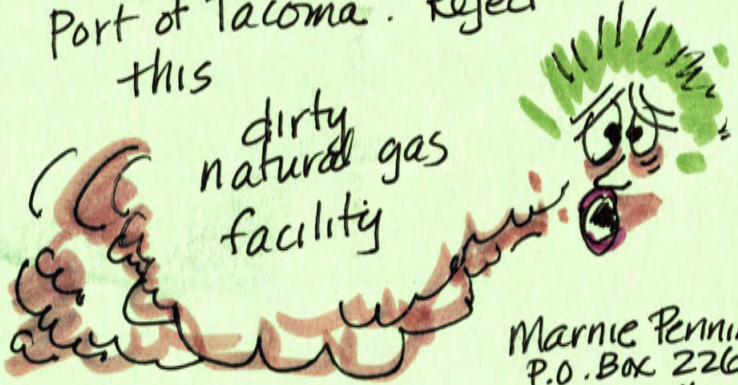
29 OCT 2018 PM 4 L

Puget Sound Clean Air Agency
1904 3rd Ave. #105
Seattle, WA. 98101

Puget Sound Clean Air Agency
RECEIVED
OCT 30 2018

SEATTLE WA 980
29 OCT 2018 PM 5 L

NO to any new fossil fuel projects - like PSE Tacoma LNG massive fracked gas hub at Port of Tacoma. Reject this dirty natural gas facility



Marnie Pennington
P.O. Box 226
Bow, WA.
98232

ment on DSEIS, PSE LI[redacted]

Dear Puget Sound Clean Air Agency,

I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

THE DRAFT SEIS DOES NOT ADEQUATELY RECOGNIZE THE FULL IMPACT OF METHANE EMISSIONS BECAUSE IT ONLY STUDIES THE LONG-TERM IMPACT; YET METHANE IS HUGELY MORE PROBLEMATIC IN THE NEAR TERM. ALL WA + OR RESIDENTS WILL BE AFFECTED!

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

_____(Check here to continue comments on the other side.) ☐ ⇨

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the project must be done.

Name: RICH PEPPERS Email: richpeppers@gmail.com

Address: 821 NE 70TH AVE, PORTLAND, OR 97213

By signing this comment card you agree to receive updates about the project.

1874-1 14. LCA Inputs and Assumptions - Leakage/Slippage

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

THE SEIS DOES NOT ADEQUATELY RECOGNIZE MULTIPLE PROBLEMS WITH THE PROPOSED TRANSFER OF BC GAS — SUCH AS APPLYING A LEAKAGE RATE ESTIMATE THAT IS TOO LOW, USING AN OUTDATED AND TOO LOW GLOBAL WARMING POTENTIAL VALUE, AND NOT PROVIDING FOR A MEANS TO END THE USE OF BC GAS IF SEIS LEAKAGE OR OTHER PROJECTIONS ARE OFF BASE. (Check here to continue comments on the other side.)

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the project must be done.

Name: RICH PEPPERS Email: richpeppers@gmail.com

Address: 821 NE 70TH AVE, PDX OR 97213

By signing this comment card you agree to receive updates about the project.

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Co... NG Project

Steve: Next up is David Perk.

David: Thank you for those comments. It's an honor to be here on Puyallup land. You've heard a lot of very intelligent comments already. Mine are going to be very short and rather focused.

[04:54:00] I'm concerned about Puget Sound Clean Air Agency's reputation. If you let this draft environmental impact statement go forward without the appropriate revision to include the most contemporary best science, that's going to reflect very poorly on the agency. And that would be a real shame, given that you've asked for the upstream emissions in the first place. That was a big step forward, and that was something that gave a lot of people a great deal of hope. This state needs more of those kinds of analyses. And your analysis needs to be exemplary, so that it sets an example for the others that need to follow.

So, I really look forward to you doing the right thing. and I look forward to a revised draft that gets public comment. Thank you very much.

[04:27:00]

Steve: So, before I call up the next speaker, just to give a heads up, the next five after that would be Mark Martinez, Kenra Brewer, Jessica Wallach, Nikie Walters, and Kelly Scott. So, Sally Perkins?

Sally: My name is Sally Perkins. I live in the Hilltop in Tacoma. The draft SEIS is inadequate because it does not include or analyze wind direction data. The wind speed data it does include is from a site at the McChord Air Force Base that is not relevant to the tide flats from a weather standpoint. To understand the impacts of air pollution related to this proposed project and its operations to say nothing of a potential explosion and fire, you have to analyze not only if air pollution will occur but also who it will harm.

[04:28:09] Both the Hilltop and the east side, historically lower income and racially and ethnically diverse communities, are in direct proximity to this proposed project. Historically, communities of color and lower income neighborhoods are disproportionately negatively affected by pollution of all kinds. At my home in the Hilltop, I have tracked the direction of the wind because I have a weather station. And my observation is that the wind is from the east, the northeast, or the north, for some portion of the day, at least 20 days of every month. The wind data downloads every 30 minutes. I have several years of data, if you would like to look at it.

What that means is that the pollution from this plant goes to the Hilltop and to the east side. I assume that the Port of Tacoma has its own weather tracking capability, and could provide the necessary wind direction data for this critically important analysis.

[04:29:04] Hilltop and east side deserve to be protected, in this process. Our neighborhoods matter. Please do the wind direction analysis regarding air pollution from this plant. The draft SEIS is incomplete and inadequate without it. It needs to be reissued with this information included. Thank you.

1212

1212-2 3. Outside of SEIS Scope
1212-3 3. Outside of SEIS Scope

1763-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 12:17:27 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Puget sound faces increased air problems. As summers get hotter, we have more and more woldfires, which make the problem worse. PSE's LNG project will make this problem worse. This is not trivial - I knew several people who died of sudden heart attack during these "bad air" days. We need lean air more than anything - fossil fuel is worthless if we have no air to breathe.

Sincerely,

Natalya Peskin
peskinn@yahoo.com
98052

1444-1 22. General Opposition

From: Madaleine Peterson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:12 PM

Name: Madaleine Peterson
Email: MadaleinePeterson23@gmail.com
Address: 214 -
Vancouver, Washington 98660

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I do not support this decision and I am a shareholder in this argument.

Carole: Thank you. Dominic Petoud? Dominic?

Dominic: Good afternoon. Thank you for letting me speak. First, I would like to thank the Puyallup Tribe whose land this is for their hospitality. And thank you, too, for being the Clean Air Bureau. On behalf of all breathing creatures, I thank you. And I would like to tell you a story. It's history.

[00:56:00] During the Civil War, right after the Civil War, they had a lot of veterans who were mutilated, terribly hurt. And a lot of them became morphine addicts. It was an enormous problem. And the scientists decided to do something for them and invent a substance that would replace morphine, so addicts wouldn't get sick anymore. And it succeeded. They invented some stuff that, when they gave it to the morphine addicts, they didn't want the morphine anymore. And they thought, a miracle. And they called it heroin. That's LNG as a transition fuel.

You know that the extraction of LNG releases a quantity of methane that will kill us. Oh, no, it won't kill us, we will be dead. Sorry. It will kill our children within 40 years.

[00:57:00] All of those gentlemen telling you that it burns cleaner, it burns cleaner, how do you get it? You get it by making the air dirtier and dirtier and trapping a lot more heat under all of that crud that should be here. You are the Clean Air Agency. They use placeholder values. They use placeholder values in the report. I can say, okay, I'm going to buy you five cars. And, right now, I'm going to say that each car is $5.00. And we're going to keep it like that just for convenience. And then, I'll tell you I can buy you five cars for five times five, is not a lot of money.

But that's not the real price of the car. Do not give an authorization to these plants before you have the real number.

[00:58:00] Save the air. Save us. Save us, please. If any one can, you can because you are the Clean Air Agency. Use that. Use it for the good of everything you love. You like to breathe. Everyone likes to breathe. Save us. Say no. Don't give them that permit. Please. Please. Please give life a chance. And that's all I have to say. Thank you for listening.

[04:13:00] So, next up would be David Phillips.

Unknown: Are you still on the afternoon people?

Steve: Yes, we are. We're getting close. David Phillips?

David: Thank you, guys. I'm not the most super educated person, kind of nervous, so please bear with us. I wasn't really planning to speak, but I got a wonderful seat here in the back overlooking a lot of the well dressed suits today smirking at the Tacoma people. Even the small children, as they fight for their future. I work with junior high kids in detention. And a lot of these guys look like they could spend some time in detention to think about what they're doing. A few things we have going on that I haven't heard yet today is that besides this land being on stolen land from our beautiful Puyallup Tribe, this land is subject to dangerous shaking, in terms of earthquakes.

[04:14:09] We are due to a large earthquake that could happen in this area, at any time. And I hope that you are considering that, in your illegal build of the project that, someday, this might just shake apart, and you might not have anything left of it. Also, I know that it didn't make it onto the ballot in Colorado, but there is an anti-fracking measure being put there. And, of course, it's being stamped upon by many rich oil companies. But people are sick of this. Yes, it is some good jobs. There are good working jobs, good blue collar jobs. But nowhere does it mean that if you're blue collar, you have to put up with detrimental environment.

You don't have to kill yourself to make a few bucks, while other people really dress nice, fly around, and spend more money on dinner than you make in a year.

[04:15:00] We want a bridge to a cleaner future, but this isn't it. I hope this is not a charade. And I don't believe in God, I don't have children, but I care more than many of these Christian fathers who come up here and talk. Thank you, guys.

1132-2 22. General Opposition
1132-2 3. Outside of SEIS Scope

1332-1 22. General Opposition

From: david phillips
To: Public Comment; Dara Phillips
Subject: attn; public comment on DSEIS, PSE LNG
Date: Wednesday, October 31, 2018 2:11:12 PM

With over 100,000 Frak wells in United States by just saying no to nlg fracking is not going anywhere. Cleaner, safer gas well fracking can be achieved by advocating the return of clean water, safe chemical legislation that we had under Pres. Obama. According to a article in scientific American, May 2013 shoddy well casings were the main problem of natural gas getting into the aqueducts and waterways. It is a absolute necessity to use non-toxic hydraulic fluids in the fracking process. The fracking regulations have been removed that the Obama administration had mandated. Plus Minimum methane leakage limits. It is estimated according to the majority of climate change scientists that the most of the greenhouse methane pollution is coming from animal livestock digestion and in second place is rice farming, which together far exceed methane leakage from natural gas processing as a greenhouse gas. it has been calculated that even though the burning of methane for better production of electricity is only half the CO2 as burning coal and when you put the methane leakage factor from the production of natural gas the greenhouse gas pollution is about the same contribution to global warming. But if you look at global warming's evil twin ocean acidification where the methane leakage is not a factor natural gas comes up 50% less CO2 contribution to ocean acidification. A few days ago, scientists working at Georgia Institute of technology have come up with solutions to make methane economical to produced fuel-cell electricity and also to produce low-cost hydrogen . The production of fuel-cell electricity would lower the carbon pollution substantially. I don't believe anymore methane burning electrical plants should be installed only fuel-cell methane electrical plants. David Phillips

1621-1 3. Outside of SEIS Scope

From: Zephyr Phoenix
To: Public Comment
Subject: Public Comment on DSEIS PSE LNG Project
Date: Saturday, November 10, 2018 11:51:34 AM

My name is Elise Nordlund. I'm a resident of Hoodsport, WA. While not currently living with the estimated 60,000+ people in the immediately impacted communities of Tacoma, my community shares water and air with Tacoma as does the rest of Washington and British Columbia. In the event of a disaster, the toxic fumes from an explosion at the facility and the fallout polluting the waters will not be contained to just Tacoma or Pierce County. As the world turns and the waters flow, even here an hour west of the facility, we would eventually also be impacted. My question then is at what cost of potential disaster to the environment, land/air/sea creatures and human suffering in Tacoma and state/region-wide do we have to pay for this facility that profits PSE alone?

I've heard the maritime industry's and workers' arguments that we need to get off bunker fuels in our shipping vessels and wholly agree. However, I don't believe switching to a fuel such as LNG (which is so environmentally damaging and dangerous to workers from its extraction through to consumption) will actually make the shipping industry any less damaging to the planet or safer for workers. Perhaps I'm mistaken, but are any more fossils being made now that will replenish this finite energy source? If we understand that peak oil is real, then why are we still relying on soon-to-be depleted resources as sustainable replacements? Now is the time end our national addiction to fossil fuels and seek sustainable forms of energy for this and all other industries. Those of you on this commission have an incredible opportunity to be courageous, forward-thinking policy makers that can shut down dirty oil and its negative health impacts. In this moment, you have a great responsibility in this matter and hold a great amount of power as well.

I thank you all for the due diligence you have undertaken regarding this study. I thank you for taking the time to hold the public comments and sit through all those hours of testimony. I thank you for caring enough about our Air, our Environment, our collective community's Health, and the Wellness of Future Generations to take on this important work!

Elise Nordlund
Hoodsport, WA

1523-1 5. Regulatory Framework

From: Haley Pickett
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:11:58 PM

Name: Haley Pickett
Email: watersprite11@gmail.com
Address: 2114 sw 4th st -
Battle Ground, Washington 98604

Comment:

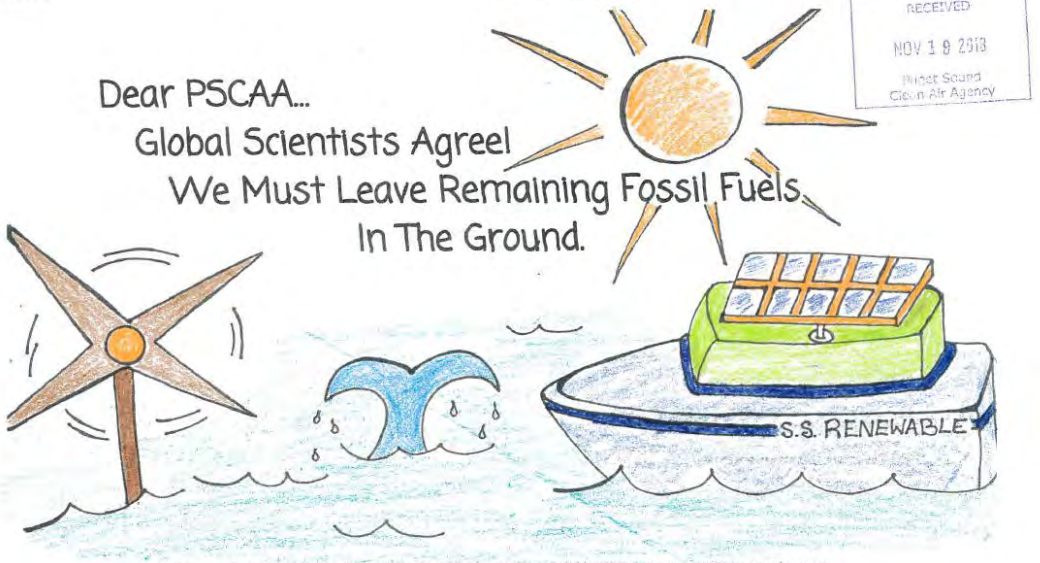
Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please reconsider building this refinery. It's wrong to build this on tribal lands without the tribe's consent, and more natural gas WILL increase greenhouse gases. It would be a terrible decision for this to be built.

1299-1 22. General Opposition

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Dear PSCAA...
Global Scientists Agree!
We Must Leave Remaining Fossil Fuels
In The Ground.



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Michelle Pirkl Age 26

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Please make a careful analysis of "slippage" of methane on the TOTES vessels. I think this has been underestimated.

(Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the project must be done.

Name: Melanie Plant Email: melanie.plant@gmail.com

Address: 3082 NE Regents Dr. 97212

By completing this comment card you agree to receive updates about the project.

0596-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am very concerned about what would happen if there were a methanol spill on the Columbia River. I understand that this would lead to deoxygenation, and creation of a "dead zone" in the river. This would seriously affect the salmon, and therefore decrease the salmon food supply for Orcas. SEIS must include an analysis of the Kalama plant's effect on marine life.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plaut	Email: melanie.plaut@gmail.com
Address: 3482 NE Regents 97212	Phone: 503 544 8223

0597-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am confused about the operational capacity of the proposed methanol plant. Why would the build a huge plant, and then operate it at a quarter or a third of its capacity? It doesn't make sense to study the environmental impacts of the refinery operating at a fraction of its capacity. We must see an analysis of the plant as if it were operating at full capacity. I

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie PLANT	Email: melanie.plant@gmail.com
Address: 3982 NE Regents Dr. 97212	Phone: 503 544 8227

0598-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I have delivered 1000's of babies during my career as an OB/GYN physician. In addition, I now have a grand-daughter. So babies are a theme in my life. The pollution created by a methanol terminal, and the increased green-house gas effects on the climate, will affect people who are infants today. Also, this will have serious adverse effects on pregnant mothers & babies not yet conceived!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plant MD	Email: melanie.plant@gmail.com
Address: 3082 NE Regents Dr. 97720	Phone: 503 544 8227

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I have visited the cemetery in Kalama where the new pipeline would be built. It is a lovely spot, with gorgeous views over the Columbia River. Clearing a permanent swath through the area, using eminent domain on the land of neighbors will cause irreparable harm to the area. Elsewise, explosions or fire (not even factored, given the risk of earthquakes or landslides) would potentially destroy the site.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plant	Email: melanie.plant@gmail.com
Address: 3052 NE Dogwood 7720	Phone: 503 544-8257

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2117-1 3. Outside of SEIS Scope

I have visited the cemetery in Kalama where the new pipeline would be built. It is a lovely spot, with gorgeous views over the Columbia River. Clearing a pathway through the area, using eminent domain on the land of neighbors will cause irreparable harm to the area. Even worse, explosions or fire (not far-fetched, given the risk of earthquakes or landslides) would potentially destroy the site.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plant	**Email:** melanie.plant@gmail.com
Address: 3082 NE Degarmo 97212	**Phone:** 503 544-8227

2118-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I have delivered 1000's of babies during my career as an OB/GYN physician. In addition, I now have a grand-daughter. So babies are a theme in my life. The pollution created by a methanol terminal, and the increased green-house gas effects on the climate, will affect people who are infants today. Also, this will have serious adverse effects on pregnant mothers & babies not yet conceived!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plant MD	**Email:** melanie.plant@gmail.com
Address: 3082 NE Regency Dr. 97212	**Phone:** 503 544 8227

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2119-1 3. Outside of SEIS Scope

I am confused about the operational capacity of the proposed methanol plant. Why would the build a huge plant, and then operate it at a quarter or a third of it's capacity? It doesn't make sense to study the environmental impacts of the refinery operating at a fraction of its capacity. We must see an analysis of the plant as if it were operating at full capacity. |

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie PLANT	Email: melanie.plant@gmail.com
Address: 3082 NE Regents Dr. 97212	Phone: 503 544 8227

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2120-1 3. Outside of SEIS Scope

I am very concerned about what would happen if there were a methanol spill on the Columbia River. I understand that this would lead to deoxygenation, and creation of a "dead zone" in the river. This would seriously affect the salmon, and therefore decrease the salmon food supply for Orcas. SEIS must include an analysis of the Kalama plant's effect on marine life.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Melanie Plaut	Email: melanie.plaut@gmail.com
Address: 3082 NE Regents 97212	Phone: 503 544 8227

1573-1 7. SEPA Alternatives

From: Not Playing anymore
To: Public Comment
Cc: amanda_korslund@yahoo.com
Subject: Just in case you haven"t heard this already.
Date: Wednesday, November 21, 2018 6:47:52 PM

Hello,

I'm Robert W. Hunt a disabled Navy Veteran, water protector, and Iriquois tribe descendent. I come from a proud water dwelling people. Not just my first nations people but my Navy people, my Italian heritage is also a proud water dwelling people. I tell you this because you have a say about a project that could destroy the water where I now live. The water that supports the life of not only millions of people but of millions of species. You have an opportunity to say no to this nightmarish proposal of a supersized lng facility. There are many alternatives to this plant if your interest is to keep the port of Tacoma fiscally viable in the future. Those options include liquid hydrocarbon fuel which would give us the ability to re-use all the carbon in the atmosphere as fuel while controlling or even sequestering any amount of carbon we wish. This method alone would solve the carbon issue in our atmosphere. There is also the new hydrogen engine from hytech a local company that could add to the viability of our local economy. https://www.hytechpower.com/
We also have solar and wind. You could attach solar panels to every single shipping container and line the hulls of the ships and containers with batteries essentially turning the entire fleet and every port into power generation instead of power loss, also increasing your economic viability. The idea of a LNG or fracked gas reservoir is just a hold out from the petroleum industry which has been entirely obsolete for over 20 years. We no longer need to serve the oil barrens. Check out Tesla. They are earning money way faster at the creation of thier technology company than any oil barren did in the history of oil exploitation. If you want to continue to exploit free energy use the Sun. It is a larger supply, volume, and bandwidth. You will get more from that than you could from any source on our tiny planet. Please support the people that wish to have a sustainable and viable future. We need this LNG facility to appease people like the Koch brothers. But they can pull their money out of current investments. We cannot pull our sound, rivers, and air out of your project. If you do this you will be impacting yourself and the next seven generations of our shared people's. We are one people's especially with globalization. We need to work together instead of separately. I volunteer to help you generate the same amount of power you will get from this lng project. I will even promise more. My group is small but we will work as a non profit and get you everything you need to keep the port of Tacoma viabile. What's yet I can offer you a deal that the Puyallup tribe will accept. I know Robert Satiacum personally and he will come with me to any meeting you set to discuss this. Please do this in a good way and don't go for LNG. It is not environmentally friendly. They leave out the fact that methane is a bigger problem than CO2 in the estimation PSE mentioned in thier defense of LNG. https://blogs.princeton.edu/research/2014/03/26/a-more-potent-greenhouse-gas-than-co2-methane-emissions-will-leap-as-earth-warms-nature/

I am Robert W. Hunt. I hope this message reaches you well. I hope you read the whole thing. I know I would read your whole message

Sincerely,
Robert W. Hunt

2011-1 23. General Support

From: Jennifer Pledger
To: Public Comment
Subject: Support alternative
Date: Wednesday, November 21, 2018 4:28:28 PM

My name is Jennifer Pledger I've lived in Tacoma since 2001. I support the liquified natural gas facility.

Thank you
Jennifer Pledger
--
Stella Grace Studios
Jennifer Pledger
253-279-2486

www.stellagracestudios.com
stellagracestudios@gmail.com

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2106-1.5 Regulatory Framework

The Cowlitz Tribe is ~~expect~~ disproportionately to the hazards of pollution and catastrophic risks of this project. The Tribe should be thoroughly consulted on mitigation and risks.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Jim Plunkett	Email: jimplunkett66@hotmail.co
Address: 7129W 53rd Ave, Portland OR	Phone: 971-266-9994

0452-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a Father, Uncle, Brother, Outdoor enthusiast, Construction worker, fisherman and Lover of our Humanity and I value the air we breathe, the water we drink and the natural world that provides Peace & sustainance for us all. My concerns about the presentation of this DSEIS are many fold but what stands out the most is the lack of proper analysis and presentation of the data included in this DSEIS. Please review and provide more current data in the analysis of GHG's and GWP of TSE's LNG facility! Thank you!

Please include this in the final supplemental environmental impact statement.

Name: Lester C. Pogue Jr	Phone: 253-302-6290
Address: 2520 6th. #3 Tacoma WA 98405	Email: lespoguejr@gmail.com

0453-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a Father, Uncle, Brother, Outdoor enthusiast, Construction worker, fisherman and Lover of our Humanity and I value the air we breathe, the water we drink and the natural world that provides Peace & sustainance for us all. My concerns about the presentation of this DSEIS are many fold but what stands out the most is the lack of proper analysis and presentation of the data included in this DSEIS. Please review and provide more current data in the analysis of GHG's and GWP of PSE's LNG facility! Thank you!

Please include this in the final supplemental environmental impact statement.

Name: Lester C. Pogue Jr	Phone: 253.302-6290
Address: 2520 6th. #3 Tacoma WA 98405	Email: lespogue jr @gmail.com

Carole: Thank you. Lester Pogue?

Lester: Respect to the Puyallup Tribe.

Carole: Just confirming you are Lester Pogue?

Lester: Yes, I am Lester Pogue. I live in the Hilltop. I breathe this toxicity every day of my life. I was attending the PSCAA's public commentary session last year, when you started this process. And I felt confident that you were going to come through and do the right thing. From my reading, that hasn't happened.

[02:40:00] I support Todd Hay's observation to redo this study with proper data analysis with the most current data. I also wish that you would include the accumulative air quality and testing that is nonexistent in the Tacoma tide ports, which you all said that was unaffordable last year, a cost of $840,000.00. To my understanding, it was 2011, since the last accumulative air study. I think that needs to be done before we introduce any other toxins to the port whatever industry down there as well as Nalley Valley. I was awakened at 7:00 a.m. a couple of weeks ago with the lithium ion battery fire to unbreathable air.

I called Tacoma-Pierce County Health, they referred me to PSCAA.

[02:41:00] I spoke to one of your scientists, a gentleman named Eric. He referred to me that I was only breathing nuisance irritant. He was not present in Tacoma. He was in Olympia. And I was there speaking to him. I asked him under what guides are the industry down at the port held to. The Clean Air Act. I hope that PSCAA will reconsider their studies and emphasize our health. You are what we're relying on. I was disappointed in reading this draft SEIS and hope that you all come up on this.

The people of Tacoma, especially the folks in Hilltop, the Puyallup Tribe, need you to come through for us, do the right thing. This is financing the system of white supremacy, which is destroying this nation.

[02:42:00] Stop this. You see the representation from folks that work down at the port. There are no people of color that have come up here and spoke about the job creation and who is getting those jobs. Let's talk about that. Do what's right. You have the science.

1175

1175-1 3. Outside of SEIS Scope

1466-1 5. Regulatory Framework

From: Sandy Polishuk Polishuk
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 10:59:40 PM

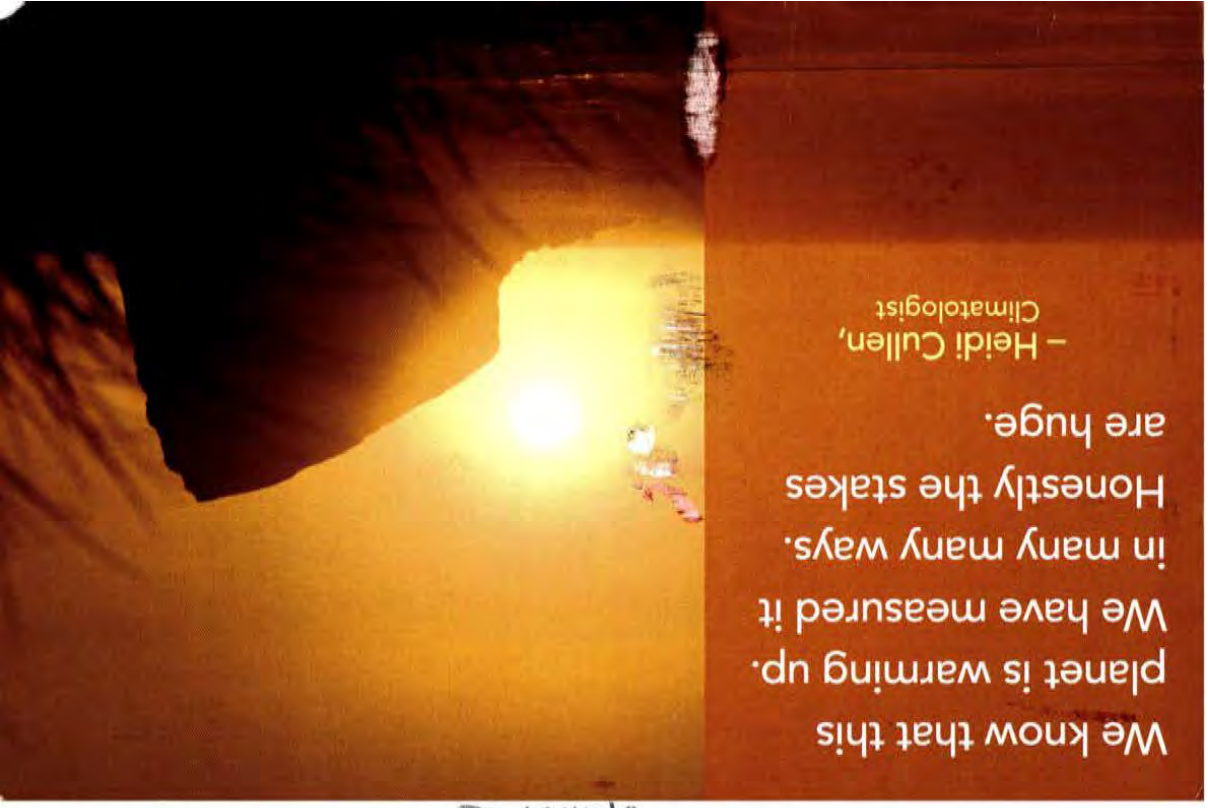
Name: Sandy Polishuk Polishuk
Email: sndybeech@gmail.com
Address: 1610 NE Tillamook St - Apt 3
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This project violates the Puyallup Tribe's treaty rights. Additionally, this project would exacerbate the climate crisis. We need to stop using fossil fuels ASAP so it makes no sense to invest in gas infrastructure any longer. We do not need it and instead should be investing in renewable energy projects.

1911-1 22. General Opposition



weather.climate25.com/voices
Photo courtesy of and © Greg Vaughn
www.GregVaughn.com

© 2017 CollectiveVision.us

POLISHUK
1610 NETTLETON Woods #3
PORTLAND OR 97212

Investing in Fossil Fuel infrastructure is wasteful. Fossil fuels are on the way out - renewables will replace them. Be smart and say "NO" to the PSE LNG Project.

Sincerely,
Sandy Polishuk

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSELNG Project
1904 3rd Ave #105
Seattle WA 98101

RECEIVED
NOV 13 2018
Puget Sound Clean Air Agency

1500-1 22. General Opposition
1500-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Kay Pollack
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:17 PM

Name: Kay Pollack
Email: vkpollack@gmail.com
Address: 2120 SW Schaeffer Rd. -
West Linn, Oregon 97068

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

With that said, I am aware of several issues with the draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.The draft SEIS for LNG facility in Tacoma does not account for the full climate impacts of fracked gas.

The methodology for measuring methane global warming potential (GWP) value is outdated, using United Nations' 2007 value of 25 for the 100-year number, whereas they should be using the 2016 value of 32, and a Furthermore, methane creates significantly more destructive greenhouse gases in the short term , and only the long-term impact is measured, minimizing the impact. The methodology also relies on the figures of industry (which will profit from the facility) to measure the cleanliness of the gas; there is no evidence that BC gas is as clean as claimed, or that the gas would come only from BC.

Perhaps most offensive of all, the draft SEIS is premised on a corrupt decision to (once again) violate the rights of indigenous people and usurp their land. Such action is insupportable!

1463-2 22. General Opposition
1463-2 5. Regulatory Framework

From: Ben Pollak Pollak
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 8:23:29 AM

Name: Ben Pollak Pollak
Email: pollak.ben@gmail.com
Address: 4105 NE Roselawn St -
Portland, Oregon 97211-8064

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This terminal is illegal, unnecessary, and dangerous. Do the right thing and stop this project immediately. Not only will there not be fewer emissions if the plant is built, no matter what other fuels people might be burning, the purpose of this pipeline is to expand our fossil fuel infrastructure at a time when the IPCC is telling world governments that we have officially run out of time for arguments and must make radical changes to survive the coming century as a species. The biosphere is on the brink of collapse, at which point you could have all the money in the world and it would be utterly meaningless as there would be no food to eat, and no water to drink. I am not an alarmist, I was warned of an impending crisis as a child, was glad to see global governments begin to tackle the crisis, and have subsequently been utterly betrayed by the "adults in the room" and now climate change is not some distant challenge it is here, now. One of the islands in the Hawaiian Archipelago was literally wiped off the map by a recent hurricane, and we can see the impacts of bigger and more powerful wildfires across the globe.

LNG is not cleaner than coal, as recent studies show that the overall emissions from fracked gas are actually HIGHER than other fuels like anthracite or even diesel. Don't believe the hype, LNG is a NO-GO!

Oh and lets not forget this terminal is being built without permission on unceded tribal lands of the Puyallup peoples, putting first foods at risk of contamination from the inevitable spills, and endangering the Salish Sea as a region.

Do what you know in your heart to be the right thing, and put an end to this disastrous project immediately!

From: Nick Potts
To: Public Comment
Subject: Tacoma LNG project
Date: Wednesday, November 21, 2018 2:19:01 PM

To the Puget Sound Clean Air Agency,

As a 'from birth' resident of Washington State, I carefully watch what is going on in our region to determine what is best for my family, neighbors, and community. I feel very strongly about keeping our waterways and shorelines clean and safe, our air healthy, and our public services properly funded. It is from this perspective that I express my support for the Puget Sound Clean Air Agency (PSCAA) to finalize the draft SEIS it presented on October 8, 2018 and to issue the permit(s) that Puget Sound Energy (PSE) has requested for its liquefied natural gas (LNG) facility at the Port of Tacoma.

We all pay our fair share of taxes, and an important benefit of the LNG project is that it will generate millions of dollars in tax revenue for local schools and other state and local government services. I appreciate and value seeing projects that will lead to increased tax revenues to help our local schools and public safety departments.

Another thing is also clear: this will be good for our local economy. I strongly support the region's efforts to create a healthy business climate for local companies who choose to do business in Tacoma. Tacoma is a working industrial marine port-based community, and both TOTE and PSE are respected, long-time area businesses here. We all benefit from both the family wage jobs they provide within the Port, and the fact that both are committed to using the best available environmental technology to remain competitive in the world economy is a boon to our entire community.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

I am confident in the conclusion of the draft SEIS that the project will result in a decrease in GHGs. I look forward to publication of a Final SEIS that confirms the draft's conclusions about LNG fuel benefits. I urge you to move forward and approve the PSCAA permit(s) for Tacoma LNG. This project will provide great benefits to the citizens of Tacoma, Pierce County, and the South Sound region for years to come.

Nick Potts
Ferndale, WA

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2054-1 3. Outside of SEIS Scope

There is no way to prove that the LNG facility or Methanol Refinery will displace other coal, oil or bunker fuel projects. This is a greenwashing platform by backers of these projects. This assumption should not be considered as part of the environmental impacts assessment; in fact, it more likely to add fossil fuel use.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell	Email: etaylorpowell@gmail.com
Address: 19306 Bothell Way NE #102 Bothell, WA 98011	Phone: 805-630-2422

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2055-1 3. Outside of SEIS Scope

With demand for natural gas in the US increasing, ~~these~~ projects such as Tacoma LNG and the Kalama Methanol Refinery will increase demand for fracking; two-thirds of all "natural" gas in the nation is fracked. Fracking is known to pollute air and water, damaging public health and contributing to climate change. The SEIS MUST include these factors when assessing fracking.

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell
Email: etaylorpowell@gmail.com
Address: 19306 Bothell Way NE Bothell WA 98011
Phone: 805-630-2423

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2090-1 3. Outside of SEIS Scope

To operate at full capacity, the refinery needs onsite electricity generation, which would be an on-site fracked gas power plant. It is likely they will say they will operate at lower capacity or "stagger production" to avoid its use. SEIS needs to include full-capacity use of a power plant to accurately understand the environmental impact of this project.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell	Email: etaylorpowell@gmail.com
Address: 19306 Bothell Way NE #102 Bothell WA 98011	Phone: 805-630-2422

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2091-1 3. Outside of SEIS Scope

A methanol spill could be devastating for salmon, and as such, should be studied. The impact on orcas, by exter will be terrible, with fewer salmon (orcas diet) reachir the Salish Sea. Kalama will take 5 million gallons/d of water from the Columbia River, and ship up to 6 tank of methanol /month on the river. The risk of a spill is statistically highly likely. Liquified gas will also likely get into the harbor. SEIS must consider the impact and include an analysis of a spill on marine life

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell	Email: etaylorpowell@gmail.co
Address: 19306 Bothell Way NE #102 Bothell WA 98011	Phone: 805-630-2422

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2092-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Methane, the primary component of fracked "natural" gas, is a greenhouse gas 86 times more powerful than CO_2, if assessed over a 20-year time period. Current estimates used for methane's impact are from out-of-date documents from the EPA & IPCC, and DSEIS will likely use these lower figures to understate their environmental impact. PLEASE ask permitting agencies to use the most UP-TO-date global warming potential for methane at [86] CO_2 equivalents.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell	Email: etaylorpowell@gmail.com
Address: 9306 Bothell Way NE, #102 Bothell, WA 98011	Phone: 805-630-2427

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2093-1 3. Outside of SEIS Scope

The SEIS must be considering potential impact of fracked gas on water, given the record of water contamination as a result of fracking, for both these refineries, regardless of whether extraction by fracking occurs in British Columbia or different sites in the U.S.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Emily Powell	Email: etaylorpowell@gmail.com
Address: 19306 Bothell Way NE, #102 Bothell WA 98011	Phone: 805-630-2423

1776-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 6:02:13 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Tacoma is my home and the home of my future generations. The PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities. These are just some of the things I would not like to leave to the children of this community. Please help protect our children and mother Earth.

Sincerely,

Olga Prado
oprado708@gmail.com
98499

2000-1 23. General Support

From: Alisa Praskovich
To: Public Comment
Subject: Public Comment on DSEIS, Puget LNG Project
Date: Tuesday, October 16, 2018 4:15:54 PM

To Whom it May Concern,

I offer my full support of the Puget LNG facility moving forward with final permit approvals. With the approach of the IMO 2020 sulphur cap on the horizon, coupled with the need to work incrementally towards cleaner ports, LNG offers the most executable, and realistic solution for the shorter term. Unfortunately neither battery or wind-based solutions for large merchant ships is simply not an option to meet the power demand required to move such heavy ships across the oceans. Vessel owner and operators must come up with a strategy to meet the IMO's sulphur cap limits: There are few options which include burning the 0.5 sulphur compliant marine gas oil fuel, installing scrubbers and continue to burn Heavy Fuel Oil, or use LNG. While LNG is not a perfect fuel, and there are concerns about the upstream impacts of extraction, the alternatives present equally troubling human health impacts in way of particulate matter, NOx and SOx.

Having read the EIS, and followed Puget LNG's process to secure the permits associated with final approval, I have high confidence they did their due diligence in meeting or exceeding all requirements. Having served on President Obama's National Ocean Council staff, I know first hand how passionate our citizens are in protecting our environment and cultural resources (I share in those passions). However, our U.S. ports are the linchpins of our national economy and security - and ship's calling on our ports must fully comply with environmental regulations. Puget LNG is offering a viable solution for compliance that will directly result in cleaner air in and around our ports (driver for the new rules). Put simply there is no perfect fuel for large merchant ships that does not have some degree of negative impact on the environment - no way to get around that. Whether its LNG or a petroleum-based fuel, there are negative consequences somewhere along the life-cycle of that fuel. As citizens, we should demand LNG terminal operators comply fully with the environmental laws in the process of securing permits. Again, I strongly believe Puget LNG has fully complied, and in some cases, exceeded the requirements, and have been transparent throughout the process. Although I do not currently live in Seattle, it was my home for 10 of my 20 years of service in the U.S. Coast Guard.

I appreciate the opportunity to have commented,
Alisa L. Praskovich

0764-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

RECEIVED
NOV 15 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Catherine Prendergast

Address or email prendercp@hotmail.com

This project threatens the local community and the stability of our climate by multiplying dirty energy. It was initially approved without any meaningful consultation with the Puyallup Tribe. Treaty rights have more authority than the rights of any other governing body or agency. The Puget Sound Clean Air Agency and all agencies involved in permitting this facility still need to consult with the Puyallup Tribe.

Steve: Thank you. Heather Price?

Heather: Hi. My name is Dr. Heather Price. I'm an atmospheric chemist and a climate scientist from Seattle, Washington. I have my PhD from the University of Washington, and I was a climate scientist with a group at Harvard. And I specialized in looking at methane. I looked at the impact of methane as a global warming gas.

[03:22:00] The impact statement that was put together is looking at global warming potential for methane that is looking at 100 year average, which really minimizes the impact of methane as a greenhouse gas. Really, it should be looking at the 20 year. And also, it's looking at an SEIS dated to 2007 rather than the most up-to-date 2016 numbers. They really should be using the 2016 and really should be using the 20 year average because this is an issue, according to the IPCC's latest report, October 8, 2018, we need to be dealing with this issue within the next 12 years. That is under the purview of the Clean Air Agency to also reduce greenhouse gases.

That is one of our air pollutants. So, we should be using the 2018. In addition, we should also be looking at the leakage rates. The leakage rates, if you have methane leaking at anywhere between two and three percent, it is as bad as coal for its global warming potential.

[03:23:06] Right now, they're using numbers coming out of BC of 0.4. That is ridiculous. Everything that I've seen and all of the emissions data that I have used has been anywhere from three percent is about the average. But it runs from about 1.9% leakage rate up to as high as 17% leakage rate. Their leakage rates are not reasonable. And they need to take into account that it's not just coming from Canada with those numbers that are really low that are coming out of the fossil fuel industry. They're not coming from emission data that is peer reviewed. Thank you.

Steve: So, before I call up the next person, I'll just give the next group of five a heads up. Benjamin Sibelman, Mary Paterson, Hillary Sanders, Holly Rydel Kelly, and Terry Velasco.

1142-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1142-2 14. LCA Inputs and Assumptions - Leakage/Slippage

1321-1 10. LCA Calculations
1321-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1321-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1321-4 19. LCA Inputs and Assumptions - End Use
1321-5 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Heather Price
To: Public Comment
Subject: Public comment
Date: Sunday, November 18, 2018 11:27:36 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up the review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma, 1.5 miles from my parents house.

I'm an atmospheric chemist and climate scientist trained at University of Washington.

As a climate scientist, and based on the recommendations of the latest IPCC report, I am advising you that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's using outdated data and/or unreliable sources for methane emissions, leak rates and global warming potential. There are also several sections missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report.

If these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing.

Here are some of the issues I have with the current report.

The SEIS is not using the best available data for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis within the next decade as recommended in the latest IPCC report. The appropriate 20-year GWP value to use is 96.

This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we have to take decisive action to curb our greenhouse gas emissions?

The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.

The leakage rates used in the SEIS are not peer reviewed nor are they reliable sources of data. A methane leakage rate of just >2-3% makes natural gas worse than coal for its climate impact. The claim that emissions will be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US, is ludicrous. The Canadian leakage rates were self-reported by the fossil fuel industry. More reliable, independently verified, and peer reviewed emissions and leak rates are available and should be used in the

report. Reliable data are based on models and recent measurements taken in the field, and show that leakage rates range from an unlikely 1.9% up to 17%. The latest peer reviewed estimate is 2.3% (journal article link below). This leak rate is within the calculated range of natural gas being worse than coal with respect to green house gas emissions.

http://science.sciencemag.org/content/early/2018/06/20/science.aar7204/tab-pdf

Also, there is no guaranteed that PSE is sourcing its gas from BC. Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.

When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS is again using a lower rate than is accepted in the literature.

Please update the SEIS with the most up to date and scientifically peer reviewed data available for methane emissions, leak and slippage rates, and global warming potentials.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science and data into consideration when revising this draft SEIS.

Heather Price, PhD

1321-5 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
1321-6 13. LCA Inputs and Assumptions - Natural Gas Source
1321-7 14. LCA Inputs and Assumptions - Leakage/Slippage

[06:41:00] So, Susan Donaldson? Amy Provenzano?

Amy: Right here.

Steve: You get the last one.

Amy: Good evening. My name is Amy Provenzano. And I am here from Seattle. And every one has really spoken the facts better than I ever could. So, just coming from my heart, people are talking about current jobs surrounding this project. And it's just short sighted.

[06:42:00] If the fossil fuel industries would have listened to climate change facts from decades prior, we would not be here in this Rialto Theater today. Much more efficient, zero waste energy sources would be well established and old news. Jobs would be intact and thriving. LNG isn't thinking of what's next or how to continue improving. A 25 year lease or more is what they're seeking. They are not interested in evolving. I wonder what the situation would look like if money weren't wrapped around and through it.

[06:43:00] Democrat, Republican, healthcare, women's rights, proper wages, and race equality, none of that will matter without a livable planet. Thank you.

Steve: Thank you. So, it's 10:00. The public hearing on this is now closed. I just want to remind everybody, I apologize for those we didn't get to.

1701-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 9:43:56 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Really? Don't you need a healthy planet to live too? Stop the unrecoverable environmental destruction! ! !

Sincerely,

Amy provenzano
heyitsmraimes@gmail.com
98103

1833-1 22. General Opposition

From: nikiq@everyactioncustom.com on behalf of Niki Quester
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 30, 2018 9:07:42 PM

Dear Responsible Official,

I am concerned about the proposal by Puget Sound Energy to site a Liquid Natural Gas facility at the Port of Tacoma. I understand PSE ratepayers will be paying 43% of the estimated capital costs of the Project ($133 million of $300 million) . This project passes on the increased cost of LNG energy to ME! This project supports a 50 year reliance on fossil fuels. This is unacceptable. I want an energy future based on solar, wind, etc.

Sincerely,
Niki Quester
Indianola, WA 98342
nikiq@centurytel.net

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2046-1 3. Outside of SEIS Scope

We cannot build the LGD site in Tacoma so close to daycares, schools. An explosion would threaten lives. And, the air pollution would hurt our youngest residents.

Please, please put my money to solar + wind. Trade ya!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Bridget Quigg	Email:	bridgetquigg@gmail.com
Address:	1830 McGilvra BLVD E Seattle, WA 98112	Phone:	(206) 310-7046

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2047-1 3. Outside of SEIS Scope

We cannot have a methanol refinery on the Columbia. The river is a lifeline for food + recreation - not to mention pure beauty. If that refinery explodes people will die.
Let's move to solar + wind!
Come on WA! Lead the way!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Bridget Quigg	Email:	bridgetjanequigg@gmail.com
Address:	1830 McGilvra Blvd E Seattle, WA 98112	Phone:	(206) 310-9056

ear Puget Sound Clean Air Agency,

2049-1 3. Outside of SEIS Scope

Why would we invest in facilities for dirty, polluting, earth structure disrupting natural gas? The holes used to store the water left after fracking destabilize the earth + cause earthquakes. Let's invest in sustainable solar + wind. Let WA state be a leader, like we were in ~~[illegible]~~ same sex marriage + Legal marijuana.

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: Bridget Quigg

Email: bridgetjanequiggy@gmail.com

ddress: 1830 McTilva Blvd E. Seattle, WA 98112

Phone: (206)310-7056

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2050

2050-1 3. Outside of SEIS Scope

I am concerned for the health of those people, particularly children pregnant women, who live near fracking sites. The chemicals in the water used for fracking aren't well understood but 50+ are cancer-causing. Please stop the natural gas facilities We need to move to solar + wind!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bridget Quigg	Email: bridgetjane quigg@gmail.com
Address: 1830 McGilvra Blvd E Seattle WA 98112	Phone: (206) 310-7052

1454-1 22. General Opposition

From: Ray Quisenberry
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:09 PM

Name: Ray Quisenberry
Email: Rayquisenberry@centurylink.net
Address: 920 5th St NE -
Salem, Oregon 97301

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It's insane to be building more fossil fuel infrastructure as we face the mounting climate change threat. Last week the fires enhanced by climate change in California hit close to home as my father's house burned to the ground near Paradise. I'm not asking you to stop the LNG Plant in Tacoma, I'm insisting that you stop the LNG Plant in Tacoma.

Stop doing immoral projects and protect us all by not approving this project.

Thank you

Ray Quisenberry

0302-1 22. General Opposition
0302-2 3. Outside of SEIS Scope

10/15

It seems to me that the Clean Air Agency should be concerned regarding the creation of a large Natural Gas facility on the shores of Commencement Bay. Along with many other environmental issues (at this location!), I'm sure that clean air would be impacted — especially in the event of leak or a spill — inevitable, no? Please consider opposing this establishment, even at this late hour. Thank you; Susan Rack, Vashon Island

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG
1904 Third Ave, Suite 105
Seattle, WA 98101

RECEIVED
OCT 15 2018
Puget Sound
Clean Air Agency

Ms. Susan F. Rack
9929 SW 206th Ct
Vashon, WA 98070

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

publiccomment@pscleanair.org

Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS,

PSE LNG Project,

1904 Third Ave, Suite 105

Seattle, WA 98101

November 18, 2018

To PSCAA:

My name is Roger Martin. I am a retired Air Force combat pilot. Subsequent to that retirement, I worked as a training developer and instructor for the B-2 stealth bomber's initial cadre of pilots, then a systems engineer for military systems, and then a manager specializing in proposals for major defense contracts. I hold a BA in Biology and Oceanography from San Jose State College and an MS in Systems Management from the University of Southern California. I am currently the coordinator for my church's Greening Activity Group at United Church in University Place.

I am strongly opposed to acceptance of the 2018 Supplemental Environmental Impact Statement (SEIS) for, and to the installation of, the LNG facility proposed for the Tacoma Tide Flats. This is for several reasons.

1. First, the location.

   We have learned that this construction location is in a) a known earthquake-fault area; b) a tsunami hazard zone; c) on land fill; and d) adjacent to Native American tribal land. For an installation that is to contain pressurized flammable gases, mixed with toxic, volatile organic compounds, in an installation that will reportedly stand 16 stories tall that is near highly populated urban areas, and be an installation and within a few miles of the West Coast's primary north-south roadway is pretty-near insane. In my lifetime, I have observed from a distance, and among other events related to manmade facilities (not in order): a) the Three Mile Island nuclear meltdown; b) the Chernobyl nuclear meltdown; c) the Exxon Valdez grounding and oil spill; d) the Deep Water Horizon explosion and oil spill; e) the Fukushima Daiichi earthquake and tsunami nuclear disaster; f) numerous railcar de-railings, chemical and petroleum leaks, fires, and explosions; g) the Shell Oil Kulluk floating oil-rig disaster (twice in one trip!) between Alaska and Washington State; h) leaks of natural-gas storage facilities (most notably Porter

Ranch in Southern California); i) numerous leaks along existing oil pipelines, including the Keystone XL and feeder pipelines; and j) one I will recount in more detail here, based on my eyewitness observation.

I was married in a full military wedding on February 2, 1969 in Santa Clara, California. Not having a lot of money, we decided to honeymoon on the beach in Southern California, complete with a drive in our two-seat, red, British TR-4 convertible, along California Highway 1. Our first night of the trip was going to be in Carmel by the Sea. Our second night was going to be in Santa Barbara, where we had dinner reservations at the end of the pier. So, on February 4, 1969, we went to that restaurant and saw oil-soaked pelicans and seagulls bobbing around in the water under the restaurant--from the Santa Barbara oil spill. 'Heck of a honeymoon, but a real lesson for a freshly graduated biology/oceanography major and newly commissioned military officer.

Although I am likely to come back to some of these issues later, I wanted to lay down some markers here. I will proceed to other matters below before coming back to detailed reflection. The big point here is that in every case, when these projects and facilities were proposed, each was going to be using the latest, greatest, most-foolproof-possible safety measures to prevent any possible accident that could ever occur, and that if one ever did occur (which we are told simply *can't* happen), it would be resolved quickly and without any damage or loss of life, because we had thought of everything and prepared for every contingency, and the government would make sure every rule and promise would be followed and kept.

2. Indian treaties

- (Quoted from the *Advisory Council on Historic Preservation Handbook* [ACHP]:) "The National Historic Preservation Act (NHPA), (16 U.S.C. Section 470f) Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on those undertakings. communication that may include written correspondence, meetings, telephone conferences, site visits, and e-mails." And, "Consultation constitutes more than simply notifying an Indian tribe about a planned undertaking."
- In addition, the Environmental Review Toolkit, published by the Federal Government, says, "The National Environmental Policy Act of 1969 (NEPA) requires the preparation of an environmental impact statement (EIS) for any proposed major Federal action that may significantly affect the quality of the human environment. The statutory language of NEPA does not mention Indian tribes. However, the Council on Environmental Quality regulations do require agencies to contact Indian tribes and provide them with opportunities to participate in various stages of preparation of an EIS."

- According to several speakers at the recent Tacoma public hearings on the proposed SEIS for the LNG facility, these consultation requirements have not even been minimally met.

3. Data are not current or accurate

   As was reported by numerous speakers at the Tacoma SEIS public hearings, the original, proposed EIS had incomplete and inaccurate data for computations used to support the Study's findings. The data in the former EIS relied heavily on information that had been available in 2007. "Placeholder" data were used in that study, based either on best-available values from studies up to that time, or estimates based on best guesses. More-accurate data were understood to be inserted as time went on and real studies were done with ever-improving and -widening information became available from better equipment and additional sampling and trend analysis. Reportedly, such data became updated in 2009, and later in 2013. Fortunately, there was an additional full IPCC report very close to submittal of this SEIS. And, although available, none of the latest data were used in the proposed SEIS. Indeed, many of the original best-guess placeholders from 2007 are still in the new document, even though new, and real, data are available.

   The Tacoma SEIS public hearings provided clear and consistent insight into how inclusion of best current data would affect the findings of the proposed SEIS. Environmental impact and possible damage from gas leakage and accidents are grossly underestimated in the current study, based on the outdated information contained in there. One witness—a college teacher (he claimed)—stated that greenhouse-gas leakage, by his quick calculations using new, accurate numbers, were roughly 2.5 times as great as those presented in the proposed SEIS.

I would like to get back to some of my earlier reflections. Specifically, I'd like to get back to some of the nuclear-plant lessons. At least, three nuclear power plants were somehow built right next to the open ocean: Diablo Canyon and San Onofre in California, and Fukushima Daiichi in Japan. At that time, several people who studied oceanography (I was an oceanography student back then) had already warned that predicted greenhouse gases would raise the sea level. But they built these plants there anyway. Brilliant, eh? The movie *The China Syndrome* was, fascinatingly, shot largely at Diablo Canyon. This was not one of the plants that did melt down. One of those that did was in Ukraine (then part of the Soviet Union), and the other was in the middle of a river in Pennsylvania.

The worst nuclear-plant disaster can be disputed as either Chernobyl or Fukushima. Again, promises were made that the safety designs were impeccable. At Fukushima, nothing could happen that could not be overcome by the wonderful safety standards that

Japan had put into place. (Apparently, nobody noticed the big ocean outside, even after all the movie monsters that had come out of it going back decades before.) People were allowed to build residences and businesses ever closer to the reactor as time went on—after all, what could happen? Other nuclear plants had been around, and hadn't blown up or been overwhelmed by a tsunami. So, why should this one? And it had been built to handle earthquakes, anyway, right? And *to government safety standards! Right?*

Then, the earthquake and the tsunami hit in 2011. In that accident, there were three nuclear meltdowns, multiple hydrogen explosions, and an estimated 1600 deaths, from a "safe" nuclear plant, because somebody had studied all the possibilities and nothing could happen that existing designs and safety procedures couldn't handle.

San Onofre was the first of the two, aforementioned US coastal plants identified for decommissioning. For a while, talk was that they could re-start it after an attempt to repair and replace parts that wore out before their initial studies had said they would (What? Overoptimistic estimates?). They also looked at what happened at Fukushima two years earlier, and perhaps started to notice that the sea-level rise predicted when they originally designed the plant was a bit underestimated (Gee, do you think so?). So, in 2013, they shut it down, never to be opened again.

Now, folks have decided it might be smart to pull the plug on Diablo Canyon too. There seems to be a trend here: Building facilities with stuff that can blow up and also contaminate a populated an area near where there are earthquakes and possible tsunamis might not be the indication of high intelligence.

So, for building on fill: San Francisco has some experience with that. In 1906, they had an earthquake. After the quake, they decided to use rubble from the earthquake and some dredging from the Bay to build a location for the Panama-Pacific International Exhibition, which then became the Marina District. In 1989, the Loma Prieta Earthquake hit at the very summit of Highway 17 between San Jose and Santa Cruz, and the land fill in the San Francisco Marina District liquified from the vibrations. In addition to water mains breaking, natural-gas (hmmm) lines broke, and fires broke out. Because of the broken water lines, water from the Bay had to be used to extinguish the fires. Land fill and gas lines have a history of being a bad idea then, don't they?

In San Francisco, there are two other buildings that were subsequently built on land fill. They are the Millennium Tower luxury high-rise, and the new bus terminal, built closely to each other. The Tower is sinking and has been discussed on several TV shows, including *60 Minutes*, and the other is the new bus terminal, which has shown structural cracking before it has even opened for regular business. How much is that all going to cost to make safe…or not? Furthermore, the entire area known as Foster City, just south of San Francisco International Airport, is sinking, at the same time the sea level is rising.

Foster City was built on land fill. And PSE (an Australian company, by the way) thinks it is just fine to build a 16-story-tall container of explosive and toxic gas onto land fill in an earthquake and tsunami zone. Brilliant!

As somebody who was college-trained as a scientist, flew in combat, authored training and technical publications both at the Air Force's Headquarters Strategic Air Command, and later, for the most-expensive combat airplane ever built, and in the defense industry was the principal manager responsible for the Technical Volumes of several DoD multi-million-dollar contract proposals, I am absolutely appalled at what was presented in this official government SEIS. It clearly needs to be re-written using current, accurate, and complete data, and with actual consultation with Indian tribes.

Disregard for federal law in consulting with native tribes, *knowingly* using outdated and misleading data on which to base conclusions that can result in disasters similar to what we have witnessed in documented events ranging from the Santa Barbara oil spill up until the immediately recent fires caused by faulty power lines in California, accepting this widely disproven SEIS would be insane, and hopefully prosecutable as a crime of fraud for which anybody who signs off on this currently proposed SEIS would be culpable.

Sincerely,

Roger T. Mart

ROGER T. MARTIN, Lt Col, USAF (Ret)

3800-A Bridgeport Wy West, #543

University Place WA 98466

We, the undersigned congregants of United Church in University Place, representing the church's Greening Activity Group, concur with the comment of Roger T. Martin to the PSCAA, dated November 18, 2018

Signature	Address
Sharon Y. Pritchett	2010 So. Union Ave. (Apt #123) Tacoma, WA
Aubrey Elliott	4317 S. 41st #11 Tacoma Wa. 98409
Mel C. Rader	3213 So 17th St. Tacoma 98405
Norma J Rader	3213 S. 17th St. Tacoma 98405
Kristin M Schmitz	3217 68th Av Ct W U.P., 98466
Patty Cummins	9815 Zircon Dr SW, Lakewood, WA 98498
Patricia Dahl	6250 N Park Ave, Apt 405, Tacoma, WA 98407
Renée Gilland	4041 Soundview Dr, University Place, WA 98466

1657-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Norma Ramirez
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 8:00:47 PM

Puget Sound Clean Air Agency,

The draft SEIS is terribly flawed and unacceptable. I write this to urge you to start over and do a new SEIS or change the current one. The draft SEIS uses an outdated methane global warming potential (GWP) from 2007. The 2007 value was used in the SEIS as that is what the Environmental Protection Agency currently uses and it is codifed in the Washington Administrative Code, WAC 173-441-040. However, we know that the UN value from 2007 is outdated and that the SEIS should use the most up to date value from 2016. This single change in the SEIS greenhouse gas model shows that the LNG plant will actually be dirtier regarding greenhouse gas emissions than if the LNG plant were not built. It is critical to use up to date values in order to get the most realistic model of what we're in for. Using outdated values creates a flimsy, fantasy model on which you are basing our future well-being.
Thank you.
Norma Ramirez
819 N. Washington St.
Tacoma, WA 98406
norma137carr@gmail.com
253.752.9757

Norma Ramirez
norma137carr@gmail.com
819 N Washington Street
Tacoma, Washington 98406

1672-1 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Norma Ramirez
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 8:03:24 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.
It is urgent that the flaws of the draft SEIS of the proposed Tacoma LNG facility be corrected before PSCAA decides on whether or not to grant an air permit for the facility. There is a gaping lack of evidence that the BC fracked gas is as clean as the draft assumes. The draft is relying mainly on reports by industry. One of the reports says it is using emissions that are lower than the industry average. So it doesn't make sense that the report extrapolates that report's methane leakage rate to all B. C. fracking wells. Also, the SEIS does not make use of methane leakage data from 2017 and 2018 reports that use empirical, independent physical studies at well sites. The 2018 report found that 85% of active wells are directly venting methane daily, and that those leakages have been in the past underreported. The same report found that methane emissions in BC are 2.5 times higher than reported. It is imperative that the SEIS base its conclusions of BC emissions on empirical, independent studies. Otherwise, these conclusions are flimsy and dangerous to our health.
Thank you.
Norma Ramirez
819 N. Washington St.
Tacoma, WA 98406
norma137carr@gmail.com
253.752.9757

Norma Ramirez
norma137carr@gmail.com
819 N Washington Street
Tacoma, Washington 98406

1673-1 3. Outside of SEIS Scope
1673-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Norma Ramirez
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 6:50:35 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. The draft SEIS was released to the public about the same time that the report from the UN Intergovernmental Panel on Climate Change was released so the writers of the draft SEIS did not have the benefit of reading the UN report beforehand. However, good science is good science and the draft SEIS was not based on the most up to date science, putting us all at great risk for suffering dire consequences in 20 years because of climate change. The writers also did not read the recent scientific report predicting multiple climate change related crises happening at once all over the world and that these can be reduced to fewer happening at once if greenhouse gas emissions are drastically reduced immediately. But they could still have incorporated the most up to date science available. We are now depending on you for leadership. Ordinary citizens, like me, and our political leaders are not decreasing greenhouse gas emissions fast enough on our own. Please step up to the challenge and redo the SEIS of the proposed LNG. Use the 20 year time frame to analyze and predict the methane emissions of the LNG, when methane emissions are at their greatest and most dangerous levels, instead of the 100 year time frame currently used in the draft SEIS. This draft SEIS and its conclusions are worthless to carrying out your mission of clean air because it relies on science we know is wrong. We don’t have 100 years to make the dramatic decreases in greenhouse gases that will protect our families. Please do a new SEIS using up to date science values and knowledge.
Sincerely,
Norma Ramirez
819 N. Washington St.
Tacoma, WA 98406

Norma Ramirez
norma137carr@gmail.com
819 N Washington Street
Tacoma, Washington 98406

[02:47:00] So, Alex Rammel is first.

Alex: Good afternoon. Alex Ramel, organizer with Stand Dot Earth. I want to start by commending you for taking on this difficult task of doing a lifecycle greenhouse gas analysis. In 2007, I was one of the lead authors of the local government greenhouse gas protocol, which is the set of standards that are used for cities and counties that wasn't to do greenhouse gas inventories. So, I know this is a big task. And I applaud you for taking it on. There are some important ways that this can be done more accurately. Others here have pointed out the Atherton research that demonstrates that BC's fracking is likely much more methane intensive than has been reported.

This is complicated stuff. They're measuring parts per billion of volatile chemicals that are highly reactive and moving in the wind. I urge you to apply the precautionary principle in doing this evaluation.

[02:48:00] The truth is that they're over 40 year lifetime for this project, PSE is likely to source their gas from more than one place. The methane emissions from those sources are going to vary. And our understanding of the science is going to evolve. My advice and the best practice, in this situation, where there's a lot of uncertainty, is to use a regional leakage rate rather than a source specific number, especially where the source specific numbers are so remarkably different than the average. The second thing I want to talk to you about is your baseline. The no action scenario assumes that TOTE Maritime will not reduce emissions in any way, over the next 40 years.

That's almost certainly incorrect. The International Maritime Organization is developing a plan to reduce greenhouse gas emissions by 50% from 2008 levels. It's debatable whether LNG belongs on the list of things that might reduce emissions from current levels, in the shipping industry. But it's absolutely clear that it's not the only option.

[02:49:00] It's not the most cost effective, and it's not the most significant. Ship routing efficiency, whole design, and slow steaming all would have a bigger impact. And they're going to be a part of the future for the industry. It should be factored into that baseline. Thanks.

1101

1101-1 13. LCA Inputs and Assumptions - Natural Gas Source
1101-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1101-3 7. SEPA Alternatives

From: Piilani Raper
To: Public Comment
Subject: Puget Sound Clean Air Agency
Date: Tuesday, November 20, 2018 6:06:34 PM
Attachments: image001.jpg
image002.jpg
image003.jpg

To Whom It May Concern:

My name is Barbara P. Raper and I have been a resident in Tacoma for 34 years. I am writing to provide comment on the construction of a liquefied natural gas facility at the Port of Tacoma. I support construction of the facility because I want an alternative to diesel for maritime uses in Tacoma.

In many respects the voice of the average person in Tacoma has been out-shouted in public discussions about the facility. From my point of view, people who are opposed to it are against the use of fossil fuels in anything, for any purpose. Yet most of them drive cars powered by gasoline and would support the LNG facility if it was "not in their backyard." I, too, am concerned about global warming and the impact of fossil fuels and greenhouse gasses. But it is laughable that we will stop using fossil fuels overnight, even in ten – 20 years, and while we seek and develop new solutions, I view the use of liquefied natural gas as a major step in the right direction.

This blind spot when it comes to a move toward something better – albeit not perfect – is very frustrating to me. If we don't use LNG now, aren't we acquiescing to the nasty fumes of bunker diesel until cargo ships run on some zero-impact power source that does not exist and will not exist for the foreseeable future? If we don't agree that a step toward better fuels, and better air quality now, is better than the status quo, aren't we deliberately allowing the further degradation of the air we breathe, at the whim of their activists that offer NO realistic solutions of their own?

After decades of the "aroma of Tacoma," this project is a perfect example of one thing we can do to support local maritime, who is leading the way toward something better. We should be ashamed of ourselves if we don't support what they want to do for cleaner air and fewer air emissions. Please allow completion of the LNG facility at the Port of Tacoma.

Thank you for your consideration.

Respectfully,

B. Piilani Raper
Alliance West Insurance, Inc.
9115 Bridgeport Way SW, Ste. 2
Lakewood, WA 98499

www.alliancewestinsurance.com
Toll Free: 877.688.0574
Direct: 253.314.5371
Fax: 253.314.5374

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1900-1 22. General Opposition

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

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Puget Sound Clean Air Agency

"Natural Gas" is as beneficial as "natural" arsenic. Methane is natural gas & it has 86 x the global warming effect of carbon We are the Pacific Northwest & we have to lead the country in taking the steps to reduce NOT INCREASE the effects of climate change (Check here to continue comments on the other side.) ☐ ➡

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Rick Kappler Email: rick@rickkappler.com

Address: 2228 MEGLE TERRACE

By completing this comment card you agree to receive updates about the project.

1624-1 5. Regulatory Framework

From: Pat Rasmussen
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 4:52:19 PM

Dear Decision Makers,

PSCAA did not consult the Puyallup tribe about the LNG plant. This is in direct violation of the Medicine Creek Treaty of 1854. The LNG project will be detrimental to the Puyallup Tribe by putting their treaty rights and community at risk. Treaties are the highest law of the land, according to the Constitution, yet they have been ignored throughout this whole process.

The SEIS must include consultation with the Puyallup Tribe. The other Tribes of the Medicine Creek Treaty - the Nisqually Tribe and the Squaxin Tribe - support the Puyallup Tribe.

The Puyallup Tribe is against the LNG plant and their position must be accepted. The LNG plant must be cancelled.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1634-1 3. Outside of SEIS Scope

From: Pat Rasmussen
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 5:55:27 PM

Dear PSCAA,

The Endangered Southern Resident Orcas of the Salish Sea are threatened by the PSE LNG project. The increased ship traffic would harm their fishing abilities due to the noise. The Governor's Orca Recovery Task Force is looking for ways to decrease noise. The LNG project would increase noise and must be cancelled.

Talequah is a 20-year-old female orca who gave birth to a female calf that died after half an hour. While many orca mothers have been seen carrying the bodies of their dead calves for a day or so, Tahlequah did so for 17 days showing humanity the damage we have done.

In August, biologists tried to help an emaciated and ailing three year-old killer whale (born December 2014), J50 also known as Scarlet, of the critically endangered Southern Resident population. J50 appeared lethargic. Scientists observing her agreed that she was in poor condition and may not survive. Responders from NOAA Fisheries and partner organizations were exploring options ranging from no intervention to providing medical treatment, potentially delivered in a live Chinook salmon, which has never before been attempted in the wild. J50 has not been seen since September 13th.

New fossil fuel projects have absolutely no business in such a fragile and diverse area like the Salish Sea, especially when the effects of these projects on the wildlife is not included in the SEIS. I am requesting that the local wildlife including endangered species like orcas, be included in the FEIS.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1638-1 3. Outside of SEIS Scope
1638-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 5:58 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

To whom it concerns,

The LNG facility has a 40 year plan even though the United Nations Intergovernmental Panel on Climate Change reports that we must change our fuels in the next 12 years or face severe consequences (where destructive hurricanes are normal and all the polar bears are extinct because there is no more ice in the Arctic). The LNG plant will speed up methane emissions and also lock Washington State into a 40 year plan, well beyond the 12 years we have to clean up our act. Also, this facility will be impacted by rising sea levels due to climate change at the Port of Tacoma.

I encourage you to read the IPCC report here:
http://www.ipcc.ch/report/sr15/

And listen by cancelling the LNG plant.

Thanks,

Pat

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 6:01 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear PSCAA,

This is a public comment on the LNG facility at the Port of Tacoma. My concern is environmental justice. The communities most impacted by fracking and LNG plants are communities of color. This includes from the extraction site to the final destination: numerous Tribes in B.C. and North Dakota (extraction sites), and the Puyallup Tribe (destination site).

At public information meetings in 2017, the Puget Sound Air Agency informed us that the facility would release ammonia, arsenic, cadmium, hydrogen sulfide, and sulfur dioxide. LNG facilities threaten human and wildlife health by destroying air quality. The emissions units in this LNG facility would have a ground flare and vaporizer unit that would emit VOCs which have been linked to birth defects, cancer, and causing damage to the nervous system. And this would happen right where people are living.

The LNG plant must be canceled.

Thanks,

Pat

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1639-1 3. Outside of SEIS Scope
1639-2 21. LCA Inputs and Assumptions - Additional Air Pollutants

1640-1 5. Regulatory Framework

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 6:03 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear PSCAA,

The Puyallup Tribe is strongly opposed to this facility right next to their marina on the Hylebos.

Puyallup treaty rights and fishing rights need to be respected by our local government. Twenty-eight Washington Tribes voted to oppose the PSE LNG. From the very beginning, the public was kept out of the loop. There was no notification to residents. Neighbors half a mile from the LNG tank proposal were not notified. As a result, SEPA only had a handful of comments from the general public. The city and port have been pushing for this development and Jake Fey, state representative, created a special LNG tax break several years ago after he was contacted by a PSE lobbyist. PSE has been spending millions on political campaigns and green-washing. The city is not acting as a neutral lead agency.

The project must be cancelled.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1641-1 3. Outside of SEIS Scope

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 6:06 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear PSCAA,

This is a public comment against Puget Sound Energy's disastrous LNG project. PSE has shown its incompetence and its history needs to be included in the FEIS. Here are a few examples:

-You (the PSCAA) issued a notice of violation because PSE started construction without going through the agency's process. These small penalties do not affect big polluters like PSE.

-PSE did not evaluate tank safety & risks, only looked at small pipeline leaks.

-PSE "safety recommendation" to handle leaks are for staff to wrap towels around leaks. LNG is minus 260 and causes cryogenic burns or even death when in contact with the human body.

-In 2016, a PSE gas line exploded and destroyed the Greenwood neighborhood in Seattle. They were fined $2,750,000 but only had to pay $1,500,000. PSE has not taken care of the community after the explosion. How will they manage a dangerous situation with the LNG facility? Since they are a Limited Liability Corporation, they will most likely pack up their things and leave since they won't be held liable.

-PSE has constructed the LNG without the proper permits. How can we trust them to uphold the conditions of the air permit? They have completely disregarded the public including the ratepayers.

The LNG project must be canceled.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1642-1 22. General Opposition

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 6:08 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear PSCAA,

On your website the 2014-2020 Strategic Plan lists your "commitments". As you know, they are:

-Be good and wise stewards of the resources you give us
-Defend the future
-Prevent and reduce risk to you by upholding and enforcing the law
-Protect you from air pollution
-Tell you what's in the air you are breathing

If you approve the LNG facility, you will be doing the complete opposite for each one of these commitments.

Cancel the LNG project.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

1643-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing

Mahoney, Melisa

From: Pat Rasmussen <patr@crcwnet.com>
Sent: Tuesday, October 30, 2018 6:10 PM
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project

Dear PSCAA,

The SEIS for the fracked gas facility should include the effects from the extraction site to the production site. This LNG facility does not stop at Tacoma. For example, the current analysis does not include the effects of using and transporting sand/water for the fracking wells. 2-8 million gallons of water may be used to frack a well. Some wells consume much more. A well may be fracked multiple times, with each frack increasing the chances of chemical leakage into the soil and local water sources. The SEIS also does not include GHG emissions from diesel trucks that are used to transport water and sand to the wells.

Thanks,

Pat Rasmussen

--
Pat Rasmussen
World Temperate Rainforest Network
PO Box 13273
Olympia, WA 98508
Phone: 509-669-1549
Website: www.temperaterainforests.org

Please say NO to new fossil fuel projects - like PSE's Tacoma LNG gas hub. Please conduct the strongest environmental review for the massive fracked gas hub. Please reject this dirty natural gas facility!

Thank you, M Ratermann mount Vernon WA

M Ratermann
1806 Cascade Vista
Burlington, WA 98233

SEATTLE WA 980
31 OCT 2018 PM 4 L

Puget Sound Clean Air Agency
1904 3rd Ave #105
Seattle, WA 98101

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Clean Air Agency

1498-1 22. General Opposition

From: Duane Ray
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:17 PM

Name: Duane Ray
Email: duaneray@frontier.com
Address: 85 SE 16th Ct -
Gresham, Oregon 97080

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We must move away from carbon sources of energy as soon as possible. Fracked gas production is particularly bad. The method of fracking for gas causes the release of much more methane into the atmosphere than other methods. Methane is much worse for global warming than CO2 (~25 times worse). The recent science on global warming tell us that earth is heating up much faster than previously thought. We must dramatically reduce our dependency on fossil fuels - especially fracked gas!

2555-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2555-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2555-3 19. LCA Inputs and Assumptions - End Use
2555-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2555-5 13. LCA Inputs and Assumptions - Natural Gas Source
2555-6 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Amy Ream
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:24:14 PM

Name: Amy Ream
Email: amybikes@comcast.net
Address: 8785 SW White Pine Lane -
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency, *
First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.
With that said, I am aware of several issues with the draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.
Here are some of the issues as I understand them:
- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG.
Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.
Thanks again for initiating this crucially important review of this facility and I hope that you

will take best available science into consideration when revising this draft SEIS.

*Clearly, this is a letter copied from those who have studied the science more than I have; however, it makes sense to me. I would like to add my own comments here. If the LNG business wants us to believe that they have our safety in mind, then why do we still have explosions of trains? They could upgrade the tracks, but they have not. They could use the new double layered oil cars, but they have not. It appears to me that it's all about the money, not about the human and environmental cost of accidents. For them, it's a cost of doing business. Oh wait, and who pays for fighting the fires and doing the cleanup? I refuse to be bullied by big business for their own profit at the cost of the environment and humankind.
Thanks for your attention.
Sincerely,

1794-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:30:22 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Jessica Reed
islandbunny757@gmail.com
98277

[04:00:00]

Steve: Carol Kindt?

Carol: Good evening. My name is Carol Kindt. Thank you for the opportunity to let us all speak tonight. I'm going to take my moment to let us all be silent tonight. To listen to the voices of the ancestors who lived here long before we ever thought about being here. To listen to the voices of the unborn children, of these young women who may not have those children because of climate change. To listen to the voices of the orcas who are almost extinct who also breathe air. Take the moment and listen.

[04:01:00]

[04:02:00] Thank you.

Steve: So, before I call up the next speaker, the next group after that, I'll give you a heads up, it's David Phillips, Suzanne Greenburg, Valerie Peaphon, Jessica Zimmerle, and Reverend Jan Ruud. So, Nanette Reetz?

Nanette: Good evening. Thank you for taking our comments this evening.

[04:03:00] My name is Nanette Reetz, and I'm a member of Advocates for Cleaner Tacoma. We are a part of a coalition of 28 environmental, health, social justice groups who oppose this project. I would like to read off the coalition members that have signed on in just this last week. This coalition is growing.

They include Advocates for a Cleaner Tacoma, 350 Tacoma, Washington Physicians for Social Responsibility, Climate Scientist, Redefine Tacoma, Native Daily Network, Vashon Climate Action Group, Climate Action Bainbridge, Protectors of the Salish Sea, Mozisca Talks, Missing and Murdered Indigenous Women and Girls' Collaborative, Civic Actions for the Salish Sea, Stop Fracked Gas PDX, Direct Action Tacoma, 350 East Side, Sierra Club Washington Chapter, 350 Seattle, Oregon Physicians for Social Responsibility, Earth Ministries, and Washington's Interfaith Power and Light, The Conversation, Legal Rights of the Salish Sea, Cascadia Wildlands, Rogue Climate, Stand Up Earth, Plant for the Planet Seattle, Green Peace USA, Climate Action Coalition, Mosquito Fleet, and the Northwest Detention Center Resistance.

[04:04:28] This coalition, as I said, is growing. And we would like to state that we, incorporate by reference, the comments of the Puyallup Tribe. Please do the right thing. Thank you.

1686-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 14, 2018 5:15:28 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution.

Sincerely,

Nanette Reetz
n.reetz@comcast.net
98422

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 3:45:59 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models - independent analyses from show that fracked gas leakage rates are much, much worse.

Sincerely,

Nanette Reetz
n.reetz@comcast.net
98422

1734-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 9:32:52 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency's analysis is based on 100-year, not 20-year, global warming potential (GWP) values. Given the IPCC report that was released last month indicating that we have 12 years to avoid climate catastrophe, the Clean Air Agency should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the "dirty fuel" it's supposed to replace.

Sincerely,

Nanette Reetz
n.reetz@comcast.net
98422

1737-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 3:01:22 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency is using an outdated methane global warming potential value – the most up-to-date modeling shows that the LNG plant is dirtier and more climate polluting than the heavy fuel oil currently used.

Sincerely,

Nanette Reetz
n.reetz@comcast.net
98422

1783-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 1:27:35 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Nanette Reetz
n.reetz@comcast.net
98422

0735-2 22. General Opposition
0735-2 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Kathleen P. Reilly

Address or email 1015 N Sheridan Ave.
Tacoma WA 98403

As a resident of Tacoma I write to affirm that
✓ we do not need the hazards a LNG facility poses to our health and well-being
✓ we are co-creators and stewards of our earth and all its peoples
therefore we need to be mindful of the risks involved
✓ Northwest Detention Center houses 1,000-1,500 people and an explosion on the tide flats could bring death and destruction to those behind locked doors
✓ we need the science to provide the answers to the questions generated by the process
✓ we need to assure that treaty rights are honored and respected for people of the Puyallup nation.

From:	Marili Reilly
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Friday, November 16, 2018 3:02:54 PM

Name: Marili Reilly
Email: cascademarili@gmail.com
Address: 3896 N.E. Alameda -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puget Sound Clean Air Agency should go back to the drawing board. The draft SEIS does not account for the full climate impacts of fracked gas. The analysis is incredibly flawed and unacceptable, and we need the Air Agency to do better before they decide on the air permit for the facility.

The draft SEIS does not sufficiently cover issues of Environmental Justice. First, at public information meetings in 2017, the Air Agency shared that the facility would release ammonia, arsenic, cadmium, hydrogen sulfide, and sulfur dioxide. LNG facilities have been shown to threaten human health by significantly degrading air quality and contributing to health-harming pollution. The proposed emissions units in this facility include an enclosed ground flare and vaporizer unit that would emit volatile organic compounds (VOCs). VOCs include a chemical complex that has been linked to birth defects, shown to cause cancer, and negatively affect the nervous system.

Secondly, the communities being most impacted by the dangers of LNG, from the extraction site to the end location, are most often low income, communities of color; and most often indigenous communities as seen here in Tacoma with the Puyallup Tribe and in B.C. the numerous First Nations suffering the consequences of fracking.

In fact, the proposed project is a direct affront to the Puyallup Tribe, putting their treaty rights and community at risk first and worst. Treaty rights have more authority than the right of any other governing body or agency. The Medicine Creek Treaty is the supreme law of the land and has been violated throughout the process for this facility.

I stand with the Puyallup in opposition to the LNG facility. The Puget Sound Clean Air Agency and all agencies involved in permitting this facility still need to consult with the Puyallup Tribe.

Respectfully,
Marili Reilly

1353-1 22. General Opposition
1353-2 21. LCA Inputs and Assumptions - Additional Air Pollutants
1353-3 5. Regulatory Framework

1773-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 7:18:59 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

We can do better than fracked gas. It takes brave and courageous leaders to think into the future for others that as yet have no voice. Please be those leaders.

Sincerely,

Tracy Rekart
tracy@mccarthyconsulting.net
98115

From: Lacey Reuter
To: Public Comment
Subject: No LNG permit
Date: Wednesday, October 24, 2018 1:07:07 PM

To Whom it May Concern,

I was born and raised in Tacoma, WA. My ancestors have lived on this land for six generations. I strongly feel that your governing body does NOT have the moral authority to permit this LNG plant to become operational and pump toxic chemical emissions into the air that I breathe. You may have the legal authority to say yes. But you certainly do not have the moral authority. We need to be improving our air quality. Not lowering it. I deserve to breathe clean air. So does everybody else. This is a fundamental human right. Please do not say yes to this project.

Furthermore, I am very disappointed that the PSCAA did not consult the Puyallup tribe about the LNG plant. It is in direct violation to the Medicine Creek Treaty of 1854. The LNG project will be detrimental to the Puyallup Tribe by putting their treaty rights and community at risk. **Treaty rights have more authority than any other governing body and they have been ignored throughout this whole process.** I don't have much faith that the PSCAA will take what we say into account after all of the corruption I have seen in the last couple of years with this LNG plant, but I hope the PSCAA does the right thing and respect the original people of the land by including the Puyallup Tribe in the SEIS.

1997-1 23. General Support

From: Reynolds, Joshua W
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 2:16:09 PM
Attachments: image001.png

Hello,

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Based on draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) on October 8, 2018, I encourage the agency to issue the necessary permits for the project to proceed.

We all need to be good stewards of environment and make responsible decisions at local, state and federal levels. All the information reviewed thus far regarding this project gives me confidence that proceeding with the project is the responsible thing to do for the community and overall environment. LNG is a cleaner fuel than Diesel so PSCAA needs to act appropriately and support PSE in making this project a success.

Josh Reynolds, CSP

HSE Manager

Office + 1 253-240-3518

Mobile + 1 281-686-1027

joshua.reynolds@mcdermott.com

-

CB&I Services, LLC

PSE LNG Facility

1001 Alexander Ave E

Tacoma, WA 98421

United States

www.mcdermott.com

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1556-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1556-2 13. LCA Inputs and Assumptions - Natural Gas Source
1556-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1556-4 3. Outside of SEIS Scope
1556-5 17. LCA Inputs and Assumptions - Peak Shaving

From: Jean-Michel Ricard
To: Public Comment
Subject: Concerns with Tacoma LNG Plant Draft SEIS
Date: Wednesday, November 21, 2018 11:31:59 PM

I am writing today to voice my concern over the current state of the draft supplemental environmental impact statement prepared by the Puget Sound Clean Air Agency for the proposed Tacoma liquefied natural gas plant. I can see from the draft that there is a stated intent of the PSCAA to determine whether the installation of the plant will lead to a rise or fall in greenhouse gas emissions and subsequently encourage the least destructive alternative. As such the PSCAA has developed some compelling arguments in favor of the proposed action, but I believe that in its current state the SEIS makes certain assumptions and uses certain outdated data that may lead it to significantly underestimate the environmental impact of the Tacoma plant. The first and most alarming issue is that the SEIS currently assigns a global warming potential value of 25 to methane, a value apparently derived from a decade-old study that has since been revised upwards. The EPA currently estimates the 100-year GWP of methane at 28-36, quite a weighty difference from an analytical standpoint. Additionally, I have heard it argued fairly convincingly that GHGs with relatively shorter lives (such as methane) should have their 20-year GWP scrutinized as well. As methane's 20-year GWP shoots up to a value of 96, I would tend to agree that in the context of the recent UN report predicting serious climate change by 2030, a 20-year impact estimate would be well worth including. The report also assumes that the plant will only source natural gas from British Columbia on the grounds that such an arrangement is a "recommended requirement for an NOC Order of Approval". As there is at present only a recommendation and not a certainty, I would think it best for the SEIS to account for the possibility that British Colombia may not end up being the only source of natural gas for the plant. Furthermore, it has come up in the recent past that leaks and emissions associated with British Columbian natural gas wells are likely significantly underreported, a discrepancy that the SEIS does not seem to treat upon. Various other externalities associated with the acquisition of natural gas via fracking—such as the vast quantities of sand (5 million pounds for the average well, according to industry estimates) and water necessary to fracture shale rock—are also not properly addressed in the SEIS. Finally, even though this goes a little outside of the purview of the SEIS, the statement assumes that LNG from the Tacoma plant would be the only alternative to dirtier fuels being used to meet peak shaving needs. I emphatically agree that it is reasonable to only factor certainties (or at least certain uncertainties) into the analysis, but the policy wonk in me feels that the installation of the Tacoma plant would do nothing to incentivize an increase in renewable energy capacity to meet peak shaving needs. Overall, I applaud the PSCAA's commitment to finding the least harmful alternative out of two unappealing options, but the SEIS has too many impactful problems for it to be of use in deciding between the two. I have faith that these issues will be meaningfully addressed and accounted for, and I look forward to commenting upon the updated version of the SEIS.

Sincerely,
Jean-Michel Ricard
Santa Barbara, CA

2220-1 22. General Opposition
2220-2 3. Outside of SEIS Scope
2220-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Sharon Rickman
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Sunday, November 18, 2018 5:46:08 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First and foremost, please reject Puget Sound Energy proposal to build the liquefied natural gas (LNG) facility at the Port of Tacoma. Puget Sound Energy is building a false solution on North America's natural gas reserves, cheap power, and abundant fresh water in a last gasp of fossil fuel extraction.
If you insist on moving forward with this dangerous, unsustainable project, please perform a complete quantitative analysis of GHG emissions upstream and downstream of the LNG facility operations.
1. Air quality impacts and leaks from LNG pumps, pipes, hoses, or tanks from proposed new and expanded pipelines from fracked gas that supply the proposed facility.
2. A process in place to baseline the air quality and leaks from LNG pumps, pipes, hoses, or tanks for the communities along the pipeline as well as the proposed facility in the port of Tacoma. How will you know if air quality discharges are too high if you do not have a baseline in which to measure against?
3. Enforceable limits on air discharges and leaks from LNG pumps, pipes, hoses, or tanks from all pipelines and facility in place to comply with binding limits.
4. Process to manage, monitor, and trigger notifications for air discharges and leaks from LNG pumps, pipes, hoses, or tanks exceeding limits against baselines.
5. A process to baseline, manage, monitor all local LNG transportation, including maritime vessels and forcible impacts.

The Tacoma LNG facility would add to the already unhealthy air quality of Tacoma. Building the LNG export facility is WRONG and will not sustain our clean energy future. Please do the right thing and reject this proposal, and all permits to stop this dangerous project.

Sharon Rickman
Sharon.slr33@gmail.com
1165 Officers Row
VANCOUVER, Washington 98661

1387-1 22. General Opposition

From: Kathy Riechel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:18 PM

Name: Kathy Riechel
Email: KCRiechel@gmail.com
Address: xxxxxxxxx -
Portland, Oregon 97214

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

I appreciate this opportunity to voice my opposition to the Puget Sound Liquefied Gas project being built in Tacoma. I would like to state categorically that any fossil fuel project--whether aimed at extracting it or transporting it--negatively impacts the international struggle against global climate change. Instead of investing in energy sources that speed up climate change and its environmental impact (such as the drought and ensuing wildfires in California), we must invest in projects that support energy sources that help curb changes to our climate.

In the best interest of the citizens of Washington and the world, I implore you to re-evaluate your data supporting the project, because it does not seem to have followed best available scientific practice. I feel certain that upon re-evaluation that you will decide to reject the proposed refinery, storage and distribution facility in the Tideflats area.

Yours truly,
Kathy Riechel

1400-1 22. General Opposition

From: Kathy Riechel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:04 PM

Name: Kathy Riechel
Email: KCRiechel@gmail.com
Address: xxxxxxxxx -
Portland, Oregon 97214

Comment:

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Yours truly,
Kathy Riechel

1414-1 22. General Opposition

From: Kathy Riechel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:53 PM

Name: Kathy Riechel
Email: KCRiechel@gmail.com
Address: xxxxxxxxx -
Portland, Oregon 97214

Comment:

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Yours truly,
Kathy Riechel

1420-1 22. General Opposition

From: Kathy Riechel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:41 PM

Name: Kathy Riechel
Email: KCRiechel@gmail.com
Address: xxxxxxxxx -
Portland, Oregon 97214

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

I appreciate this opportunity to voice my opposition to the Puget Sound Liquefied Gas project being built in Tacoma. I would like to state categorically that any fossil fuel project--whether aimed at extracting it or transporting it--negatively impacts the international struggle against global climate change. Instead of investing in energy sources that speed up climate change and its environmental impact (such as the drought and ensuing wildfires in California), we must invest in projects that support energy sources that help curb changes to our climate.

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Yours truly,
Kathy Riechel

1433-1 22. General Opposition

From:	Kathy Riechel
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Thursday, November 15, 2018 1:56:37 AM

Name: Kathy Riechel
Email: KCRiechel@gmail.com
Address: xxxxxxxxx -
Portland, Oregon 97214

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

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Yours truly,
Kathy Riechel

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 2:21:29 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

After reading thought the SEIS it has become clear to me that the report is not thorough, lacks crucial data points in 23 areas:

- through put (page 68)
- fuel composition (page 72)
- source of Natural Gas (page 73)
- gas transport distances (page 73)
- captured and sold condensate (page 73)
- data on all aspects of facility operation (page 76)
- actual data (page 77)
- fuel use for each LNG application (page77)
- data on methane losses (page 78)
- fugitive emissions from operation (page 78)
- end use applications (PAGE 80)
- placeholder values (page 80)
- type of equipment (page 82
- natural gas properties (page82)
- trapped volumes for LNG transfers (page 82)
- additional data (page 82)
- data on construction materials (page 83)
- data on the end use of LNG (page 83)
- displacement of LNG for diesel fuels (page 83)
- emissions of CH4 and N2O (page 83)
- energy inputs, emission for alternative peak shaving (page 83)
- data requested (page 206)
- natural gas properties (page 208)

The report was prepared by Environment and Ecology Inc., the same company who produced the flawed LNG EIS for the City of Tacoma. I understand this company has never before completed a SEPA application before. Because of the missing data this report is incomplete and I request from the Clean Air Agency that a new, independent and thorough report be done with diligence and complete data. It is nearly impossible to make proper and informed comments on this report.

Best
Claudia Riedener

1245-1 10. LCA Calculations
1245-2 5. Regulatory Framework

From: ixia@harbornet.com
To: Public Comment
Subject: draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 2:21:28 PM

SEIS draft comments for LNG facility, Port of Tacoma

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

After reading thought the SEIS it has become clear to me that the report is not thorough, lacks crucial data points in 23 areas:

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- data on methane losses (page 78)
- fugitive emissions from operation (page 78)
- end use applications (PAGE 80)
- placeholder values (page 80)
- type of equipment (page 82
- Natural gas properties (page82)
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- Additional data (page 82)
- data on construction materials (page 83)
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- emissions of CH4 and N2O (page 83)
- energy inputs, emission for alternative peak shaving (page 83)
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- natural gas properties (page 208)

The report was prepared by Environment and Ecology Inc., the same company who produced the flawed LNG EIS for the City of Tacoma. I understand this company has never before completed a SEPA application before. Because of the missing data this report is incomplete and I request from the Clean Air Agency that a new, independent and thorough report be done with diligence and complete data as it is nearly

impossible to make proper and informed comments on this report.

Best
Claudia Riedener

1245-2 cont'd 22. General Opposition

1246-1 1. Determination of SEIS Scope - Comparison to FEIS
1246-2 3. Outside of SEIS Scope
1246-3 3. Outside of SEIS Scope

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 11:51:06 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years, I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

The original GHG emission numbers from the refinery alone according the FEIS totaled 20,751 tons per year at production numbers of 250,000 gal/LNG per year. Now in the SEIS we learned that production numbers have doubled and that GHG output has increased even more drastically due to a different ground flare design. The increased GHG gases now are over 100,000 tons each year at full production. Does this trigger an EPA permit and reporting requirement? Who sees to that? These substantial changes call for a new FEIS. Who holds the responsibility for that?

Puget Sound Energy sued the State of Washington over the clean air rule WAC 173 -442 Clean Air Rule (2016). Does this mean none of the clean air rules were applied in your report?

Who is covering the costs of the SEIS, including PSCAA staff time?

Due the massive increase of fracking for gas in B.C. to feed the LNG boom, new fracking wells in new and geographically different areas are now producing up to 50% condensate, a highly toxic and volatile fracking by-product. In assessing climate impacts of LNG production, these unintended side effects must be considered as they impact our climate in a direct and harmfully way.
https://oilprice.com/Latest-Energy-News/World-News/LNG-Projects-Will-Help-Boost-Canadas-Ultra-Light-Oil-Production.html

1246-4 19. LCA Inputs and Assumptions - End Use
1246-5 12. LCA Inputs and Assumptions - Global Warming Potential Value

LNG does not have the same power as other fuels to transport cargo through rough weather, wind and waves. TOTE's LNG engines are dual fuel and can burn LNG or diesel. What are the estimates of extra diesel use in heavy seas? What guarantees do you have that TOTE would actually burn LNG even when market fluctuations would mean higher costs than diesel? In the end TOTE is free to burn whatever is cheapest to them, right? Or will fuel consumption be accurately tracked, and if so by whom?

I am urging PSCAA to reject the SEIS in its entirety and use actual B.C. leakage rates and 20 year GWP. Also important and reason to reject the SEIS is that the information and project description in the FEIS and the SEIS are substantially different. Throughput production, capacity, end use, peak shaving reasoning all have changed too drastically to be believable in the SEIS. The city would use FEIS not SEIS for actual construction and operating permits.
As you prepare to make decision for the community, please consider your own mission:

- Be good and wise stewards of our resources
- Defend the future
- Prevent and reduce risk by upholding and enforcing the law
- Protect us from air pollution
- Tell us what's in the air we are breathing.

Please hold true to your words and consider people and a living planet over the mighty dollar.

Best
Claudia Riedener

1247-2 1. Determination of SEIS Scope - Comparison to FEIS
1247-3 19. LCA Inputs and Assumptions - End Use
1247-4 19. LCA Inputs and Assumptions - End Use

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 11:00:15 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.
Draft SEIS comments for LNG facility, Port of Tacoma

When the SEIS on greenhouse gases was drafted, it appears as though the actual Final Environmental Impact Statement was not consulted. In regards to the end uses, the FEIS and the DSEIS vary greatly. The various contradictions between the documents make both untrustworthy and call for a new, independent third-party impact analysis by entities other than the subcontractors that have produced the flawed FEIS and flawed DSEIS.

End uses:
On-road trucking.
According to the FEIS, the PSE facility would not be an LNG gas station to direct fuel trucks. To assume without LNG facility road trucks would burn diesel has several flaws. 1) trucks cannot and would not be fueled at LNG refinery. 2) there is already an LNG gas station near I-5 (not PSE operated), and trucks who have engines designed for LNG can use that station. 3) LNG road trucks cannot be fueled with diesel.
To assume without LNG diesel would be the only alternative is inherently wrong given the many trucks, busses, and vans that are already available fully electric.

Truck to ship bunkering
According to the city of Tacoma planning department staff, only two 10,000 gal LNG tanker trucks are allowed day, and only after the roads are fixed so they can handle the dangerous LNG trucks. No use for the LNG on these trucks has been identified by PSE to date. To assume diesel would replace the LNG fuel that has no customers again is pure speculation. PSE is still claiming WA ferries will use LNG, when in reality WA ferries have made clear they are going electric. Without LNG bunkering infrastructure and LNG-ready vessels, there is simply nowhere for the LNG to go. Assumptions on GHG reductions for the two LNG tankers a day cannot be made.

Bunker barges
Since the elimination of the Hylebos dock due to heavily polluted sediment, there is no barging dock anyplace for LNG barges. City of Tacoma staff Schultz has made it clear that the TOTE dock is not possible to be used for barges:

- The configuration of the fueling arm is unique to the TOTE ships, and a conventional bunker barge could not be fueled using this infrastructure.
- The TOTE site does not have moorage facilities or shoreline permit approval for construction

to accommodate a bunker barge.

Yet the SEIS claims over 120 million gallons (at 500 gal/day production numbers) for barging alone. That is blatantly false and simply not possible, unless PSCAA can claim that city information is wrong. This whole section of the SEIS must be scrapped.

It is disappointing that the DSEIS appears to be confused not only on the actual end uses of the LNG, but even the actual production numbers of LNG vary by 100%. In no other project description would such a massive discrepancy be allowable. Imagine a builder would approach a city demanding a building permit not knowing if the building would have 50 or 100 apartments, or if there would be 50 or 100 parking spots. The very basic information on this refinery is simply lacking.

Let’s remember that the facility owners would benefit from many $ millions in tax breaks each year, that it would cost rate payers well over $ 134 mil and that this facility would pollute our air and water, expose the population to dangers and be in operation long after all of us are gone. PSCAA owes it to the people of Tacoma and the people in the entire region to do due diligence when it comes to permitting a 40-year fossil fuel refinery. I do not believe best available science and due diligence were used when preparing this report.

Best
Claudia Riedener

1247-4 cont'd 19. LCA Inputs and Assumptions - End Use
1247-5 1. Determination of SEIS Scope - Comparison to FEIS

1248-1 1. Determination of SEIS Scope - Comparison to FEIS
1248-2 17. LCA Inputs and Assumptions - Peak Shaving
1248-3 17. LCA Inputs and Assumptions - Peak Shaving

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 9:49:13 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

The description of the various (potential) end uses of the LNG itself has been a constable moving target. The uses as described in the DEIS is so drastically different for the FEIS and from various PSE statements, that the actual FEIS has become a work of fiction and must be redone it its entirety.

Peak Shaving – the ever-changing thing:
At 2016 UTC hearing, PSE claimed that peak shaving was needed to supply residents with the needed gas on 2 or 3 cold days every few years. Consequently, the UTC approved that 43% of the LNG facility would have to paid for by PSE gas utility customers.

Statement from PSE spokesperson to KPLU two days AFTER the FEIS was issued:
"*It's going to primarily serve as a back-up to our natural gas distribution system. So on that coldest day in January, when we all need more gas to heat our homes and businesses, we can return some of that liquefied natural gas to our distribution system*," said Grant Ringel, a PSE spokesman.

"About 43 percent of the LNG at the facility would be used to serve PSE's Western Washington customers when their gas heating needs peak in cold weather, said Roger Garratt, director of strategic initiatives for PSE."
https://www.seattletimes.com/seattle-news/environment/puget-sound-energy-puyallup-tribe-in-showdown-over-lng-plant-on-tacoma-tideflats

Now, According to the SEIS, the peak shaving gas would be used to burn for electricity generation. DSEIS Page 136: "operation of diesel fired power generation during periods of natural gas shortages. Therefore, natural gas us ed for peak s having would enable natural gas fired power generation."
Since the announcement of the SEIS, PSE advertisement has changed to say they need peak shaving for electric power, a statement never made before the announcement of your SEIS.

It makes no sense to make gas customers to pay for gas used in electricity generation, especially rate payers in Tacoma, who have plenty green public power via Tacoma Public Utilities. I do not believe the UTC would have approved 43% of LNG costs for gas rate payers if PSE would have stated they will burn the gas for

electricity, as it would be inherently unfair to force gas customers to pay for electricity capacity.

Given the directly conflicting statements by PSE regarding peak shaving, to assume that without LNG diesel use would increase is beyond speculation and cannot be counted as GHG reduction via LNG. It also ignores innovation in electricity storage currently being used by other large scale utilities who have decided to move away from fossil fuel burning. California can no longer afford to ignore climate chaos. Can Washington afford to burn away 40 more years? The decision is up to you.
https://www.utilitydive.com/news/storage-will-replace-3-california-gas-plants-as-pge-nabs-approval-for-worl/541870/

The earlier stated peak shaving use of 2-3 days every few years suddenly ballooned to 10 days every year in the SEIS (page 132: Up to 10 days per year, the Tacoma LNG Facility is expected to operate in a holding mode while LNG is vaporized). It seems as though PSE is trying to make us believe our winters are getting rapidly colder…when all data points in the opposite direction.
Best

Claudia Riedener

1248-3 cont'd 17. LCA Inputs and Assumptions - Peak Shaving
1248-4 17. LCA Inputs and Assumptions - Peak Shaving
1248-5 17. LCA Inputs and Assumptions - Peak Shaving

1249-1 5. Regulatory Framework
1249-2 5. Regulatory Framework

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 8:20:35 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts and the public comment opportunity. Over the last several years, I have been closely following this new fossil fuel facility in the Port of Tacoma, along with other facilities that negatively impact our air, land, water and wildlife.

The DSEIS deals with PSE's LNG climate impacts. With the following comments I'd like to diverge somewhat and comment on something crucially important to the entire project.

The location on Alexander Avenue has a badly polluted history. In the early 20th century, the LNG refinery location was productive tidelands and accustomed and usual fishing/gathering grounds of the Puyallup Nation. Such grounds are protected by the Medicine Creek Treaty of 1854, which is the Supreme Law of the Land and as strong as the U.S. Constitution itself. Such accustomed and usual fishing rights were upheld again in the 1974 Boldt Decision.

Over the years, those fishing and gathering areas were filled with toxic Asarco slag and other debris, along with Puyallup River dredgings. The Puyallup River bottom rightfully and legally also belongs to the Puyallup Tribe. The Treaty Rights of the Puyallup Nation have not been nullified by these habitat destroying actions by the port and other entities. Indeed, during several municipal court jury trials over the last two years, neither the city nor the port have been able to produce evidence that said land belongs to them or that they have the right to lease it out. The Pierce County Assessor's office is not in possession of an original warranty deed or warranty trust for the LNG parcels. Please verify who if anyone has original documents.

The Treaty Rights also include the government's responsibility to meaningfully consult with the sovereign Puyallup Nation on issues affecting the fishing and gathering grounds, such as in this case building polluting fossil fuel infrastructure on an already very toxic fill and on top of and next to a Superfund site, one of the worst in the nation. Neither port, city, nor the clean air agency have taken this responsibility serious and with proper care. When the state transferred SEPA lead agency status to the city of Tacoma, the responsibility transferred as well, and now it also rests with the Clean Air Agency.

On this eve of the Thanksgiving holiday we are reminded of the many injustices that the Puyallup People and all indigenous First Peoples of America have endured. I urge you to not continue travelling down the same road.

I am asking for the Clean Air Agency to use utmost diligence and care in regards to the location, proper ownership, the Treaty Rights and fishing rights as well as proper

consultation to be conducted before anything else.

It’s unconscionable that so many government agencies have stood idly by as the refinery has been built over the last year and a half without proper permits nor properly identifying who the rightful and legal owners are. The LNG location lies outside the actual tribal reservation but very clearly within the Treaty Right waters and tidelands – their usual and accustomed fishing and gathering grounds, where the Puyallup People have sustainably harvested and practiced their culture for millennia.

Best

Claudia Riedener

1250-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1250-2 13. LCA Inputs and Assumptions - Natural Gas Source
1250-3 3. Outside of SEIS Scope
1250-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1250-5 3. Outside of SEIS Scope

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 5:20:25 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years, I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

Analysis does not incorporate diesel emissions for transporting sand/water to fracking wells:
Nearly all (98%+) of the wells in British Columbia are fracking wells and fracking requires large consumption of water and sand for its operation. The SEIS, however, does not include the GHG emissions from the diesel trucks used to transport the water and sand to the wells, nor the energy it takes to mine the sand and ship it from as far away as Asia.

Deforestation and loss of carbon retention:
DSEIS has not taken into account the amount of forest lands that are being clear-cut for gas extraction and the resulting transport and burning of the biofuel. Even without actual extraction, exploratory seismic lines take our large amounts of trees and bring degradation to the forests and harms the natural function as a carbon sink.

Material failure:
Aging of the actual facility and all the supporting pipeline infrastructure from the well to the facility as well as end-use infrastructure of LNG have been ignored by the report. Older pipes have more leak potential, as well as more explosion and devastation potential. How often do parts and pipelines in the PSE network fail, or are being damaged due to construction or accidentally bored into sever lines? All those leaks are allowing methane to escape straight into the atmosphere.

Human error:
Simple human error such as faulty work orders caused one death, two dozen injured and over 80 buildings destroyed due to massively over-pressurizing an aging system. What are the carbon footprint costs to all the gas pipelines leaking and exploding?
https://www.usatoday.com/story/news/nation/2018/10/11/ntsb-natural-gas-explosions-columbia-gas-lawrence-north-andover/1604415002/
PSE gas line to and from the LNG facility is reverse flow and pressurized. Human error and/or ageing can result in large releases of methane. The destruction of many buildings would cause GHG hg releases from disposing of debris and rebuilding. In 2016, PSE received the highest ever fine in WA due to their negligence in blowing up a Seattle neighborhood. Debris and reconstruction impacts and GHG releases of frequent leaks and accidents need to be considered.
https://www.seattletimes.com/seattle-news/greenwood-explosion-caused-by-

abandoned-unsealed-pipeline-regulators-say/

Best
Claudia Riedener

1251-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1251-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1251-3 19. LCA Inputs and Assumptions - End Use
1251-4 19. LCA Inputs and Assumptions - End Use
1251-5 11. LCA Inputs and Assumptions - General

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 4:40:54 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

No plan for changes in BC methane leaks or leak estimates:
The SEIS locks PSE LNG into getting fracked gas from Canada regardless of the actual methane leak rates. If later studies show that actual leaks are considerably larger, what happens? Will operations at the facility be halted until the new studies are applied?

Regulations do not equal Implementation:
The SEIS claims that we should expect to see reductions in the amount of upstream fugitive emissions given B.C.'s new, tough regulations on fugitive methane emissions. However, just because a regulation has been passed, that does not mean that it has been actually implemented in the field. The SEIS should only assume methane emission leak rates based on empirically collected data, and not on plans. We see what can happen to a government with change in leadership. Assuming EPA rules to stay in place for 40 years might have seemed possible just 2 years ago. Now the EPA is run by oil and gas interests. We cannot assume policy stability in our own country, there is no way to predict what Canada will or won't do.

Analysis assumes credit for extra maritime customers that currently do not exist:
The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.

Questionable Methane Slippage Rates for TOTE Vessels:
The SEIS appears to be using unacceptably small methane slippage rates (the amount of unburned methane that will escape into the atmosphere) for the TOTE maritime vessels that will be burning the LNG. Even in PSE's own greenhouse gas life cycle analysis (that they completed and is provided as part of this report) their external peer reviewer questioned PSE's assumption on their methane slippage rate. That same PSE report indicated that PSE should be using the higher rate, as that is considered best practice.

Cut Off Threshold
The SEIS includes a 1% cutoff threshold, such that any emissions source is excluded when the source produces less than 1% of the total GHGs for the system. We need to understand all of the sources that fall into this cut off threshold category and the

1251-5 cont'd 11. LCA Inputs and Assumptions - General
1251-6 7. SEPA Alternatives

notional percentage of GHG emissions coming from those sources. If the analysis incorporates multiple sources less than 1%, but cumulatively these add up to a significant percentage of the overall GHG emissions (say three 0.8% sources adding up to 2.4%), this would be significantly under-representing the true GHG emissions.

No alternative option for ships is a false assumption:
TOTE Maritime is the only shipping company in the Port of Tacoma that has committed to converting their vessels to run on LNG. TOTE is already compliant with the Maritime Organization (IMO) low sulfur emissions requirements, as it has been using ultra-low sulfur diesel (ULSD) since February 2017. Therefore, TOTE has no regulatory need to convert to LNG, despite the false and repeated claims by TOTE, PSE, Port and business interests. Other companies are either also using ULSD or are incorporating scrubbers into their vessels to meet the IMO requirement. TOTE converted to using electric, shore-based power when they are in port in Tacoma, cutting local emissions that would increase again due to LNG refinery. WA State Ferries considered converting to LNG, but abandoned the idea in favor of electric engines. Other maritime shippers in the port have refused to adopt LNG, even though it would the cheapest available fuel (real reason behind TOTE's conversation, as they already promised steep cuts in rates once LNG comes online). Wallenius Wilmhelmsen, now leasing the old methanol refinery site in the port, make clear that LNG does not meet their green approach.



Four-stream compliance approach

One good example of our proactive approach concerns the 2020 global sulphur cap change. It is undoubtedly good news in terms of both health and the environment, however it will also have greater impact on industry than any previous regulation.

> Wallenius Wilhelmsen believes there is no 'silver bullet' solution for compliance, which is why we have been pursuing a four-stream compliance approach.

Post January 1st, 2020 we will comply through use of three of those four streams namely: Marine Gas Oil (MGO), exhaust gas scrubbers and Ultra Low Sulphur Fuel Oil (ULSFO). The fourth stream, Liquid Natural Gas (LNG) has so far not met the requirements of Lean:Green for RoRo vessels in global operation.

Best

Claudia Riedener

1252-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1252-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1252-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: ixia@harbornet.com
To: Public Comment
Subject: Draft SEIS comments for LNG facility, Port of Tacoma
Date: Wednesday, November 21, 2018 4:18:12 PM

Dear Puget Sound Clean Air Agency,

Thank you for the supplemental study on LNG climate impacts.
Over the last several years, I have been closely following this new fossil fuel facility in the Port of Tacoma. As a resident and someone who bikes, kayaks and recreates by and near the port, this project would directly affect me. I am also deeply concerned about climate chaos and unintended consequences.

The only two options analyzed in the DSEIS the are 1) building the LNG facility or 2) no action, under which it is assumed diesel would be used for the next 40 years instead of many LNG applications, some of them not even in the FEIS by City Of Tacoma. This assumption is very unrealistic given conservation, innovation and the advancement of clean technologies such as wind sails on container ships, hydrogen fuel cells, battery storage and electric propulsion, such as state ferries are investing in right now.

The DSEIS assumes that the LNG refinery would have a 40-year life span. The reason given is that “many existing plants have been running for more than 40 years” (page 64). How many other LNG facilities have you analyzed and where are they located? PSE itself claims a 30-year life span for the facility.

The DSEIS uses an outdated methane global warming potential (GWP) value:
GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane has a much larger GWP value, especially over the short term. The draft SEIS uses the United Nations’ 2007 value of 25 for the 100-year number (i.e. the methane average GWP over 100 years), whereas they should be using the 2016 value of 32. This single modification in SEIS GHG model makes the LNG plant dirtier from a greenhouse gas emissions perspective than if the LNG plant were not built.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	84	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

Methane is significantly more potent in the near-term, yet the SEIS analysis only looks at the long-term impact:
Methane is a significantly more potent greenhouse gas than carbon dioxide, especially in the short term. The DSEIS analysis is based on the 100-year GWP of methane. The IPCC report released a report on October 8th, indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years. Therefore, the SEIS should use the 20-year numbers, as that is the timeframe where action is

needed. Using the most recent 20-year value of 96 makes the LNG plant 50% dirtier than the current capability.

Lack of evidence that BC fracked gas is as clean as they claim.
The draft incorrectly assumes that B.C. fracked gas would result in a significant GHG emission reduction. The reports used to justify such conclusion were models or self-reported by industry. The three B.C. based reports all require further analysis to determine if they can even be extrapolated to B.C.-wide fracking wells. One of the reports, states that the emissions examined in the report are lower than industry average due to a variety of reasons. It's would be inappropriate to extrapolate the methane leakage rate from that report to all of B.C. fracking wells. The SEIS fails to incorporate methane leakage data from recent 2017 and 2018 reports that use empirical, independent physical studies at well sites. The 2018 report found that 85 percent of active wells are directly venting methane daily, and that those leakages have been historically underreported. The same report found that methane emissions in BC are 2.5 times higher than reported.

No guarantee that all of the fracked gas would come from BC:
The DSEIS claims all of the natural gas would be coming to the facility from British Columbia. During the recent natural gas pipeline explosion in B.C. on October 10th, PSE was able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. PSE's own 2017 10K filing with the Securities and Exchange Commission (SEC) shows that in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). How will the Air Agency hold PSE accountable to bringing in only B.C. gas?

On their own webpage, PSE stated only about 50% of their gas would be from B.C. Right after PSCAA announced the SEIS on GHG, PSE swiftly changed their page to say ALL the gas would be from B.C.
Here the dated screen shots:



1252-3 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
1252-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1252-5 13. LCA Inputs and Assumptions - Natural Gas Source

Best
Claudia Riedener

Steve: Thank you. So, next up is Dan Riley.

Dan: Good evening. My name is Dan Riley. I'm a resident of Gig Harbor, Washington. I'm recently retired. I've spent my career in the petroleum energy sector. In 2008, the International Maritime Organization set regulations to reduce the sulfur content in marine fuel. These regulations reduced the sulfur 3.5% down to 0.5%.

[05:52:00] The regulations go into effect in 2020. At that time, marine operators have, basically, two viable choices. They can either switch their marine vessels to diesel or to natural gas. I want to speak today in favor of both the liquified natural gas facility that TOTE Maritime's extraordinary commitment to convert their Orca fleet to LNG and also for the LNG facility. As someone who analyzes these issues, TOTE's commitment to convert to LNG represents a $700 million plus investment and the cleanest next generation fuels available. To me, this is an infrastructure project.

As we watch the skylines change in our urban areas due to our robust economy and building projects, we also need to invest in energy infrastructure projects, so that we can keep pace with the rest of our area's development. This LNG facility and the TOTE commitment will build LNG infrastructure for the west coast that can power our shipping fleet as they convert to LNG in the future.

[05:53:04] Building innovation and new energy infrastructure matters. The Northwest Seaport Alliance and the Greater Puget Sound community would be irresponsible, if we didn't build for the future. People opposing the facility are living in the past ignoring the ports around the world who are building LNG facilities to service the conversion of vessels to natural gas. As a person who believes that climate change is real, it is vital, as the UN report states, that we take immediate action to address the problem. If that is true, then, why would we not embrace the project? Your agency's own lifecycle analysis documents that 13.5% reduction in greenhouse gases.

As someone who has spent my career in the petroleum sector, I can assure you that those kinds or projects that will create a 13.5% reduction don't come along very often. We need to get on with the transition to cleaner transportation fuels.

[05:54:00] If we embrace the global challenges of climate change, then, we cannot say no, not in my backyard. Area code 253, 425, and 206 need to do their part, if we truly care about climate change. Thank

you. I urge you to approve the project.

2017-1 23. General Support

From: rileydt55@gmail.com
To: Public Comment
Subject: Tacoma LNG Facility
Date: Wednesday, November 21, 2018 5:09:20 PM
Attachments: Dan Riley TOTE LNG.docx

Please accept these comments on the Tacoma LNG Facility.

November 21, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

RE: Tacoma LNG Facility

My name is Dan Riley, I am a resident of Gig Harbor, Washington. I have spent my career in the energy-petroleum business.

In 2008 the International Maritime Organization set regulations to reduce the sulfur content in marine fuel, these regulations that reduce sulfur from 3.5% to 0.5% go into effect in 2020, marine operators have two choices, switch to diesel or Natural gas.

I am in favor of both the liquified natural gas facility and TOTE Maritime's extraordinary commitment to convert their Orca fleet to LNG. As someone who analyzes these issues, TOTE's commitment to convert to LNG represents a $200 million-plus investment in the cleanest next generation fuel available. To me, this is an infrastructure project. As we watch the skyline change in our urban area due to the robust economy and building projects, we also need to invest in energy infrastructure projects to keep pace with our areas development. This LNG facility and TOTE's commitment will build LNG infrastructure for the West Coast that can power our shipping fleet as they convert to LNG. Building innovative and new Energy infrastructure matters. The NW Seaport Alliance and the greater Puget Sound Community would be irresponsible if we don't build for the future. People who are opposing this LNG facility are living in the past and ignoring that Port's around the world are building LNG facilities to service the conversion of vessels to natural gas.

As a person who believes in climate change, it is vital, as the UN report states that we take immediate action to address the problem. If that is true, then why would we not embrace this project? The air agencies own lifecycle analysis documents a 13.5% reduction in greenhouse gases. Again, as someone who has spent years in the industry, I can assure you the ability to reduce greenhouse gases by a minimum of 13.5% is very rare. These opportunities simply do not exist. Conversely, if we don't approve this facility and the air agency does not issue the air permit, then you will simply have these ships powered by diesel fuel. The Air Agency and opponents simply cannot have it both ways. A decision against this project and TOTE's LNG Conversion is a decision against innovation and a decision for more more greenhouse gases.

Let's get on with the transition to cleaner transportation fuels.iIf we are to embrace the global challenges of climate change, then we cannot just say "not in my backyard." Area codes 253, 425, and 206 need to do their parts if we truly care about climate change.

Dan Riley

13907 47th Ave CT NW

Gig Harbor, WA 98332

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2030

2030-1 3. Outside of SEIS Scope

Gentlepeople:

Thank you for taking the time to read my concerns about fracking. I think fracking is far too risky a method of obtaining fuel. There are other ways much cleaner and safer for producing energy than via fracking.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Marrigan Ritter	Email:
Address: 1737 211th Place NE Sammamish, WA 98074	Phone: 707-481-3991

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2035-1 22. General Opposition

Thank you for reading my concerns about fracked gas as an energy source. As a grandmother of 2 young boys, I want them to experience as clear and clean environment as they can. Our children and grandchildren will have to live with the consequences of our actions.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Marilynn Ritter	Email: lritter45@gmail.com
Address: 1737 211th Place, N.E. Sammamish, WA 98074	Phone:

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2041-1 22. General Opposition

Thank you for reading my concerns about fracked gas. I think that the negative results of achieving fuel in this manner offsets the positive gain. We need to work together to solve the problem of energy in such a way that our planet is left unharmed

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Marilynn Ritter	Email:
Address: 1737 211th Place NE, Sammamish, WA 98074	Phone:

1590-1 3. Outside of SEIS Scope
1590-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1590-3 6. Purpose and Need
1590-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1590-5 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Phil Ritter
To: Public Comment
Subject: LNG Tacoma - SEIS Comment
Date: Monday, November 5, 2018 12:51:33 PM

1. The upstream methane emissions analysis needs to include the full number of years that PSE will use as "Useful Life" of the facility. Investors get their Return on Investment over that period and if they are required to cease operations in a shorter period of time the investors will have to be compensated for the "taking" of their asset.
2. The analysis also needs to use the actual methane historical leakage rate recently documented for both the production and transmission process.
3. The analysis also needs to assume that domestic use of the LNG locally will be consistent with current local usage including maritime usage, and that the bulk of the methane will be exported to a growing Asian market.
4. The analysis needs to assume that the facility will run at full capacity to meet export demand and that upstream pipeline expansion and leakage will need to increase over time.
5. The analysis cannot assume a significant reduction in methane leakage upstream from new technology not yet proven; it must use currently available technonogy.

Sincerely,

Phil Ritter, CPA
1737 211th Place NE
Sammamish, WA 98074

ar Port of Kalama, and Cowlitz County,
ar Puget Sound Clean Air Agency,

2027-1 3. Outside of SEIS Scope

THE SEIS ON THE METHANOL FACILITY SHOULD ASSESS IMPACTS ASSUMING PRODUCTION AT 100% OF CAPACITY, BECAUSE THERE IS NO RATIONAL BASIS TO ASSUME THAT A FOR-PROFIT ENTITY WILL DO OTHERWISE

ease include this impact in the Final Supplemental Environmental Impact Statement.

ame: PHIL RITTER
Email: philr@sonic.net
ddress: 1737 211TH PLACE NE
Phone: 707-481-0984
SAMMAMISH WA 98074

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2028

2028-1 3. Outside of SEIS Scope

THESE SEIS DOCUMENTS NEED TO ADDRESS THAT THE THE ADDITIONAL FRACKED GAS PRODUCED WILL NOT NECESSARILY RESULT IN REDUCED USE OF OTHER PETROLEUM PRODUCTS SUCH AS LOW SULFUR DIESEL FUEL.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: PHIL FITTER	Email: philv@sonic.net
Address: 1737 211TH PL NE SAMMAMISH WA 98074	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2032-1 3. Outside of SEIS Scope

These projects will increase the demand for fracked gas, which will damage public health, pollute water and contribute to climate change.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Phil Ritter	Email: philr@sonic.net
Address: 1737 211th Place NE Sammamish WA 98074	Phone:

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2033

2033-1 3. Outside of SEIS Scope

THE SEIS SHOULD ADDRESS THE IMPACTS OF THE ON-SITE FRACKED GAS POWER PLANT, OPERATING AT FULL CAPACITY SINCE THERE IS NO ASSURANCE THAT IT WON'T.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: PHIL RITTER	Email: philr@sonic.net
Address: 1737 211TH PLACE NE SAMMAMISH WA 98074	Phone: 707-481-0984

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2040-1 14. LCA Inputs and Assumptions - Leakage/Slippage

THESE PROJECTS WILL FILL EXISTING PIPELINES WITH FRACKED GAS - PRODUCING ~ 8% LEAKAGE FROM SOURCE TO USE. THAT IS NOT ACCEPTABLE.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: PHIL RITTER	Email: philr@sonic.net
Address: 1737 211th Pl. NE Sammamish WA 98074	Phone: 707 481-0984

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

THE SEIS MUST CONSIDER THE POTENTIAL IMPACT ON WATER OF GAS THAT IS FRACKED, for BOTH WELLS IN THE U.S AND CANADA.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: PHIL RITTER	Email: philr@sonic.net
Address: 1737 21st Place N.E SAMMAMISH, WA 98074	Phone: 707-481-0984

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2051-1 22. General Opposition

I WANT MY GRANDSONS TO HAVE THE SAME OPPORTUNITY I HAVE HAD TO EXPERIENCE ORCAS AND SALMON IN THE PUGET SOUND. SHIPS FULL OF METHANOL AND LIQUIFIED FRACKED GAS POSE A SERIOUS RISK TO THAT EXPERIENCE

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: PHIL RITTER	Email: philr@sonic.net
Address: 1737 211TH PL NE SAMMAMISH, WA 98077	Phone: 707-481-0984

1804-1 13. LCA Inputs and Assumptions - Natural Gas Source
1804-2 13. LCA Inputs and Assumptions - Natural Gas Source

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 21, 2018 11:54:01 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Agree 1000% with this from Val Peaphon:

he Puget Sound Clean Air Agency is relying on a risky make-or-break assumption that the Tacoma LNG Project will only be supplied natural gas from British Columbia (BC). Is this based on PSE's word? How is it guaranteed/proven/enforced? I believe this assumption/expectation to be false.

Also, why do you accept the assertion that natural gas from BC is cleaner? Is this rooted in scientific evidence or based on self-reports from industry? "According to Natural Resources Canada, about 50 percent of Canadian gas was derived from fracking in 2014, and the figure is expected to increase to 80 percent by 2035." (Powell, Tarika. Is Your "Natural" Gas Actually Fracked? Sightline Institute. Web. 30 October 2017. www.sightline.org.)

Please consider PSE will say anything to get their LNG project approved.

On PSE's own website, www.tacomacleanlng.com, they have said many things on the subject. Below are excerpts from PSE materials and website content over time (see attachments):

Originally in PSE's FAQ piece they stated half of their gas comes from the United States:

Q: "Does PSE produce natural gas?"
A: "No, we purchase 100 percent of the natural gas supplies needed to serve our customers. About half the gas comes from British Columbia and Alberta and the rest comes from the Rocky Mountain states."
Q: "Do you buy gas that has been fracked?"
A: "About 50 percent of the natural gas in the US comes from hydraulic fracturing (fracking). While the debate regarding its effect on the environment will continue, we support rules and regulations that ensure safety and protection of ground water during the drilling of natural gas."

Then, as PSE started to receive pushback regarding the environmental degradation caused by fracking they revised their messaging to highlight horizontal drilling as an alternative yet they continued to say they get their gas from both Canada and the United States:

Q: "Where does PSE get the natural gas for this facility?"
A: "PSE has no natural gas wells of its own. We buy 100 percent of our natural gas, either from Canada or Rocky Mountain states. We are a local natural gas distribution company that supplies gas within the State of Washington. Fracking – hydraulic fracturing- has been employed by the natural gas industry for many years, though with the advancement of

1804-3 11. LCA Inputs and Assumptions - General
1804-4 13. LCA Inputs and Assumptions - Natural Gas Source

horizontal drilling technology, new supplies of natural gas are available for recovery."

Next, PSE starts to omit what extraction method will be used altogether but again maintains they get their gas from both Canada and the United States:

Q: "Where does PSE get the natural gas for this facility?"
A: "As a local gas distribution company, PSE provides natural gas to 800,000 customers throughout western Washington. We have no natural gas wells of our own. We buy 100 percent of our natural gas, either from Canada or the Rocky Mountain states."

Now, conveniently, PSE reports:

Q: "Does PSE produce natural gas?"
A: "No, we purchase 100 percent of the natural gas supplies needed to serve our customers. All gas for this facility will be brought from British Columbia, Canada."

The DSEIS's conclusion there will be an overall decrease in greenhouse gas (GHG) emissions relies on the sole source of natural gas coming from BC. If PSCAA were to abandon that assumption, would there still be a net reduction of GHG emissions? PSCAA should run the numbers showing other likely outcomes if something less than 100% of the gas were to come from BC. What if that number is reduced to 75%, 50%, or even 25%?

The Tacoma LNG Project should not be granted a NOC order of approval. The Puget Sound Clean Air Agency's DSEIS on the proposed Tacoma LNG project is unacceptable. If the permit is not denied outright, I am requesting you conduct a new study figuring that natural gas will come from a variety of locations. Once that is complete, please open another public comment period.

Sincerely,

LaDonna Robertson
pianolady492000@yahoo.com
98405

2235-1 10. LCA Calculations
2235-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: LaDonna Robertson
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 10:40:46 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

Puget Sound Clean Air Agency
Seattle, WA
11/21/2018, 7:29 PM

To Whom It May Concern:

These are just some of the shortcomings developed by a coalition of groups including Advocates for a Cleaner Tacoma (ACT), Sierra Club, 350 Seattle, Washington Physicians for Social Responsibility (WPSR) and 350 Tacoma. One could bring up any of these in a comment:
• The Draft SEIS is Incomplete – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have “placeholder” values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
• SEIS is Using Outdated Methane Global Warming Potential Value – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.
Report 20-year GWP 100-year GWP
2007 IPCC AR4 72 25
2013 IPCC AR5 86 28
2016 Scientific Study (authors include lead from 2013 study) 96 32
• Analysis is based on 100-year, not 20-year, global warming potential (GWP) values – They

base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.

• Questionable claims that B.C. fracked gas is as clean as they claim – They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.

• What assurances do we have that all of the fracked gas would come from BC? They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).

• Analysis assumes credit for extra maritime customers that currently do not exist – The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.

• Questionable Methane Slippage Rates for TOTE Vessels – It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE’s own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE’s assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.

• Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Background

Puget Sound Energy is trying to build a Liquefied Natural Gas (LNG) refinery, storage and distribution facility in the Tideflats area of Tacoma. It is sited on Puyallup Tribal lands and is being built without their consent. There are many concerns about the project ranging from taxpayer and ratepayer subsidization, safety issues, and environmental impact.

The Puget Sound Clean Air Agency (PSCAA) holds the power to grant or deny a key permit for the Puget Sound Energy (PSE) Liquefied Natural Gas (LNG) project in Tacoma. Finding the initial Environmental Impact Statement (EIS) lacking, they opened up a Supplemental Environmental Impact Statement (SEIS) process to take into account the life cycle impacts of natural gas (mostly fracked these days) in terms of its role in climate change.

Sincerely,

2235-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2235-4 13. LCA Inputs and Assumptions - Natural Gas Source
2235-5 13. LCA Inputs and Assumptions - Natural Gas Source
2235-6 6. Purpose and Need
2235-7 14. LCA Inputs and Assumptions - Leakage/Slippage
2235-8 16. LCA Inputs and Assumptions - Hydraulic Fracturing
2235-9 5. Regulatory Framework

LaDonna Robertson
pianolady492000@yahoo.com
1709 S G Street, APT. 113
Tacoma, Washington 98405

1386-1 22. General Opposition

From: Mike Robinson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:18 PM

Name: Mike Robinson
Email: Miker2024@gmail.com
Address: 2215 Dogwood St NE -
TACOMA, Washington 98422

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Look... We have lived almost 40 years on the bluff overlooking The Port of Tacoma ..raised 4 children and 7 grandchildren here and we vehemently oppose the proposed installation of a liquefied natural gas facility only a stones throw from our back yards on Puyallup tribal land, and all pending efforts to continue/repeat or support/the crazed practice of fracking by mindless petroleum ie fossil fuel consumption when we know there are options that are cleaner and safer.. And especially less likely to generate C02. Suggest you see data of William Nordhaus of Yale, who won recent Nobel Prize for his analysis of the negative economic impact of fossil fuel dependence. NORDHAUS has studied greenhouse effect for four decades, and says, "The policies are lagging very very far __miles, miles, miles behind the science and what needs to be done." Please lead on instituting a carbon tax instead of pillaging the earth.

1399-1 22. General Opposition

From: Mike Robinson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:04 PM

Name: Mike Robinson
Email: Miker2024@gmail.com
Address: 2215 Dogwood St NE -
TACOMA, Washington 98422

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Look... We have lived almost 40 years on the bluff overlooking The Port of Tacoma ..raised 4 children and 7 grandchildren here and we vehemently oppose the proposed installation of a liquefied natural gas facility only a stones throw from our back yards on Puyallup tribal land, and all pending efforts to continue/repeat or support/the crazed practice of fracking by mindless petroleum ie fossil fuel consumption when we know there are options that are cleaner and safer.. And especially less likely to generate C02. Suggest you see data of William Nordhaus of Yale, who won recent Nobel Prize for his analysis of the negative economic impact of fossil fuel dependence. NORDHAUS has studied greenhouse effect for four decades, and says, "The policies are lagging very very far __miles, miles, miles behind the science and what needs to be done." Please lead on instituting a carbon tax instead of pillaging the earth.

1410-1 22. General Opposition

From: Mike Robinson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:53 PM

Name: Mike Robinson
Email: Miker2024@gmail.com
Address: 2215 Dogwood St NE -
TACOMA, Washington 98422

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Look... We have lived almost 40 years on the bluff overlooking The Port of Tacoma ..raised 4 children and 7 grandchildren here and we vehemently oppose the proposed installation of a liquefied natural gas facility only a stones throw from our back yards on Puyallup tribal land, and all pending efforts to continue/repeat or support/the crazed practice of fracking by mindless petroleum ie fossil fuel consumption when we know there are options that are cleaner and safer.. And especially less likely to generate C02. Suggest you see data of William Nordhaus of Yale, who won recent Nobel Prize for his analysis of the negative economic impact of fossil fuel dependence. NORDHAUS has studied greenhouse effect for four decades, and says, "The policies are lagging very very far __miles, miles, miles behind the science and what needs to be done." Please lead on instituting a carbon tax instead of pillaging the earth.

1426-1 22. General Opposition

From: Mike Robinson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:40 PM

Name: Mike Robinson
Email: Miker2024@gmail.com
Address: 2215 Dogwood St NE -
TACOMA, Washington 98422

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Look... We have lived almost 40 years on the bluff overlooking The Port of Tacoma ..raised 4 children and 7 grandchildren here and we vehemently oppose the proposed installation of a liquefied natural gas facility only a stones throw from our back yards on Puyallup tribal land, and all pending efforts to continue/repeat or support/the crazed practice of fracking by mindless petroleum ie fossil fuel consumption when we know there are options that are cleaner and safer.. And especially less likely to generate C02. Suggest you see data of William Nordhaus of Yale, who won recent Nobel Prize for his analysis of the negative economic impact of fossil fuel dependence. NORDHAUS has studied greenhouse effect for four decades, and says, "The policies are lagging very very far __miles, miles, miles behind the science and what needs to be done." Please lead on instituting a carbon tax instead of pillaging the earth.

1431-1 22. General Opposition

From: Mike Robinson
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 6:47:36 AM

Name: Mike Robinson
Email: Miker2024@gmail.com
Address: 2215 Dogwood St NE -
TACOMA, Washington 98422

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Look... We have lived almost 40 years on the bluff overlooking The Port of Tacoma ..raised 4 children and 7 grandchildren here and we vehemently oppose the proposed installation of a liquefied natural gas facility only a stones throw from our back yards on Puyallup tribal land, and all pending efforts to continue/repeat or support/the crazed practice of fracking by mindless petroleum ie fossil fuel consumption when we know there are options that are cleaner and safer.. And especially less likely to generate C02. Suggest you see data of William Nordhaus of Yale, who won recent Nobel Prize for his analysis of the negative economic impact of fossil fuel dependence. NORDHAUS has studied greenhouse effect for four decades, and says, "The policies are lagging very very far __miles, miles, miles behind the science and what needs to be done." Please lead on instituting a carbon tax instead of pillaging the earth.

Carole: Thank you. Margo Rolf, please?

Margo: Good afternoon. I've done a fair amount of scratching out also. My name is Margo Rolf. Two weeks ago, the IPCC, Intergovernmental Panel on Climate Change, released its findings in a report in which they said that we must keep the warming of the earth to 1.5 degrees Celsius. Unfortunately, it has already increased by 1 degree Celsius. We have until 2030 to make a significant change to lowering carbon dioxide or, by 2050, there will be catastrophic changes.

[02:04:07] Yet, the life of this LNG plant is anticipated to be 40 years taking it to 2060. At what point are we going to listen to experts whose only, or at least main interest, on the issue is the future of our planet? Deborah Roberts, co-chair of the IPCC working group said, "The next few years are probably the most important in our history." I ask that you please consider that report before the decision is made. I would also like to briefly mention some items on methane, since it's being presented as being so clean. We know, of course, that it is 86 times worse as a greenhouse gas. That it leaks along the way making it worse.

And we wonder why the pipes cannot be constructed in such a way that they don't leak.

[02:05:04] Is it even possible, in an earthquake pone area? As you may know, last night, at 12:45 a.m., there was 2.9 earthquake 2 miles north-northeast of University Place, Washington. Could it be nature's way of saying to those of us who care about policy in Tacoma, what are we thinking, what are we doing? This is the wrong project, in the wrong place, and definitely in the wrong time. Thank you.

1182

1182-1 3. Outside of SEIS Scope
1182-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

1837-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Margo Rolf
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 3:51:24 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am an area resident and I am concerned about the negative man-made effects on our climate and the limited time that we have to act to start mitigating the damages to our environment. In the recent report by the Intergovernmental Panel on Climate Change it is reported that we must make progress by 2030 if we are to avoid catastrophic climate events by 2050. Making progress does not include adding additional fossil fuel facilities, especially when they have an up to 40 year usage span. Please consider this report (IPCC) and its latest information based on real science gathered from more that 6000 studies from around the world. We are at a unique place in the history of mankind in that we have an opportunity to better insure the safety of our planet and the life thereon. That possibility of a healthier life for this generation and future ones does not include more fossil fuel pollutants. It is time to stop adding carbon dioxide and also all the added impacts of m ethane, which has a stronger effect in the first 20 years by 86% than CO2, and this needs to be considered in your evaluation. Please consider the findings of the IPCC report as you do further study.

Thank you.

Margo Rolf

Margo Rolf
margorolf@aol.com
29610 2nd Pl SW
Federal Way, Washington 98023

2547-1 22. General Opposition
2547-2 3. Outside of SEIS Scope
2547-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2547-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2547-5 7. SEPA Alternatives
2547-6 7. SEPA Alternatives

From: lyrom2@everyactioncustom.com on behalf of Lynn Roman
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 1:53:37 PM

Dear Responsible Official,

First... I am furious that any movement on this project has begun BEFORE a full environmental study was performed. How can that be allowed to happen?
Thankfully this project has been delayed... but I believe the study will show it must be stopped altogether if the side effects of fracking on the environment are fairly weighted in this study.
I support all efforts to prevent taking our country and any environmentally sensitive part of our country deeper into the use of fossil fuels when alternatives are definitely available!
Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106

(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Lynn Roman
Philadelphia, PA 19131
lyrom2@aol.com

1755-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 9:49:08 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

It's past time to start a new way, to make an economy that promotes life on this planet. We need to stop allowing any destruction. We have many non-destructive means of energy. That's where we need to create infrastructure. The world economy is leaving us behind. Our politicians are leading us in the wrong direction.

Sincerely,

Maggie Rose
maggie.a.rose@gmail.com
98230

1855-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to ~~deny the permit~~ because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The analysis used a 100 year Global Warming Potential for methane emissions. Given the crucial timeframe outlined in the most recent UN IPCC report, we have a 12 year window to avoid dire consequences by 2040. Therefore the 20 year Global Warming Potential should be used. In the first 20 years methane is 86 times more dangerous/impactful than CO_2.

(Check here to continue comments on the other side).

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Daniel Roth Email: danielroth22@gmail.com

Address: 416 NW 13th Ave. #315 Portland, OR 97209

By completing this comment card you agree to receive updates about the project.

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The leakage rates used for the fracked gas wells in the analysis were vastly too low. Recent studies have shown that leakage rates are typically underreported for fracked gas wells. Ensure that the analysis is accurate.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Daniel Roth Email: danielroth22@gmail.com

Address: 416 NW 13th Avenue #315 Portland, OR 97209

By completing this comment card you agree to receive updates about the project.

Name _____

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The Supplemental Environmental Impact Study uses unacceptably small methane slippage rates, which underestimates the amount of methane that will escape into the atmosphere. Their assumptions were even questioned by their external peer reviewer. Require them to use the higher rates (Check here to continue comments on the other side). that meet ~~industry~~ best practices for environmental impact.

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Daniel Roth Email: danielroth22@gmail.com

Address: 416 NW 13th Avenue #315 Portland, OR 97209

By completing this comment card you agree to receive updates about the project.

2189-1 3. Outside of SEIS Scope

From: talonclaws@everyactioncustom.com on behalf of Chris Rousseau
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 11:08:59 AM

Dear Responsible Official,

Please find another option other than 'fracking' for energy. Please take care of the earth. I know it sounds cliche, but this planet is all we've got.

Sincerely,
Chris Rousseau
Clarkston, WA 99403
talonclaws@gmail.com

2223-1 22. General Opposition
2223-2 22. General Opposition
2223-3 22. General Opposition
2223-4 3. Outside of SEIS Scope

From: John Rowe
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, November 12, 2018 8:32:17 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I was at the open house you held at Rialto recently. Thanks for opportunity to hear both sides. I came into the meeting against it and after hearing the pro side, came away so much more convinced this is a BAD project.

I don't want to pay to make PSE's Australian owner even more rich, or for TOTE's greenwashing PR with this dirty gas. What' so clean about Natural gas if the source results in folks having burning flames come out of their faucets from fracked gas chemical soup getting into their groundwater?

The Maritime Industry, nor the Port of Tacoma and hence the city of Tacoma itself, does not rise or fall on this LNG project. Correction: it certainly won't rise, but could potentially lead to our fall.

Contrary to one comment I heard at Rialto, Alaskans being fed, does not rise nor fall with this LNG project. I used to live there and my company ships there all the time. This was pure drama comment.

The family man concerned about air quality if this doesn't pass was intriguing. As if this is the only way he can get clean air into his kids lungs!! Converting to green energy so they would actually HAVE A REAL FUTURE was a choice lost on him. If he is that concerned about the dirty air they are NOW CURRENTLY breathing is he having them wear gas masks outside while they play? I think not.

The other pro comments about Natural Gas being best current option is resigned, myoptic, shortsightedness at its best. A TOTAL disregard for the upstream costs of this "Clean" energy.

I have personal experience with fracked gas and it is INSIDIOUS, it poisoned my uncles well water for crying out loud! This form of gas extraction is PURE EVIL!! Why are we supporting the byproduct of this criminal activity that is protected by cigarette science?

Finally, all the pro comments seemed to have jobs as a common vested interest. These jobs do not even amount to a fraction of one percent of Tacoman jobs and to cater to their desires while IGNORING the CLEAR WILL of the PEOPLE is and would be a most unfortunate decision you will have to live with.

PLEASE STOP CHASING THE QUICK EASY AND DIRTY DOLLAR.

Tacoma has one of the most beautiful waterfronts on the west coast. Don't lose sight of this

tourist jewel we own and cultivate it accordingly.

John Rowe
jrowe@mchutchison.com
1213 S. Ainsworth Avenue
Tacoma, Washington 98405

0345-1 19. LCA Inputs and Assumptions - End Use
0345-2 17. LCA Inputs and Assumptions - Peak Shaving
0345-2 cont'd 9. LCA Methodology

RECEIVED
OCT 29 2018
Puget Sound
Clean Air Agency

October 25th, 2018

Dear Puget Sound Clean Air Agency,

We have reviewed the draft SEIS for greenhouse gas emissions for the PSE LNG plant in Tacoma. We appreciate your taking the environmental impacts of this project seriously and for requiring the completion of this GHG SEIS. We are writing as we have a number of technical questions concerning the project that are preventing us from completing a thorough analysis of the draft SEIS. Given the serious and extensive nature of the concerns that we have identified, and given the numerous places where data is incomplete, we respectfully request answers to these questions and then the re-issuance of a new draft SEIS, followed by another 30-45 day public comment period. We are not able to adequately analyze the SEIS in its current state.

Our questions are as follows:

Main Document

Section 2.3.5, Page 2-4:
It is stated that ship bunkering would occur for a total of 8 hours per week. Please confirm that this is for Tote Maritime only and does not include the potential future maritime customers. What are the estimates for the non-Tote maritime vessels?

Section 3.3.1, Page 3-5:

1) While we recognize that PSE currently uses diesel for peak shaving operations, please explain why is it assumed that all peak shaving would be supplied with diesel fuel. Please detail any other options that PSE has considered for meeting peak shaving demands (e.g. purchase of electricity from Tacoma Power, purchase of batteries, development of other renewables, and conservation). Please also detail any programs that PSE is part of (such as Green Energy programs) that could potentially be used for peak shavings.

2) Please explicitly state the instantaneous power, in MW, and energy, in MWh, required to meet peak shaving demands. What is the source for the estimate that 5.89 million gallons of diesel per year is required for peak shaving?

3) Later in the document (Appendix C, p. 16, Section 1.3; Appendix C, p. 24, Section 2; Appendix C, p. 35, Section 2; Appendix C, p. 60, Section 3.2.3; Appendix C, p. 70, Section 5; Appendix C, p. 74, Section 5;) it is stated that peak shaving would only occur for 10 years; is that the assumption here as well? Please confirm that this is a valid assumption.

Section 4.3.2, Page 4-7
Major clarifications are needed for Tables 4-3, 4-4 and 4-5 in order to understand the analysis. Please provide a table or figure that defines every term used, specifies what energy type it refers to (electric, diesel, LNG, or other) and clarifies which analysis method in the appendix

was used to determine the GHG emissions. Also, please use terms in Table 4-5 that are identical to terms used in Tables 4-3 and 4-4, or where that is not possible, include a footnote to the table explaining them.

Table 4-3, Page 4-8
Upstream Life-cycle
Power LNG Production. Please explain what this is. Does this refer to electricity used to run the LNG plant? Is this the electricity that will be purchased from Tacoma Power, which the models assume will "WA ave mix?" (This appears in Table 4-5 under the category "electricity").

Diesel Emergency. Please confirm if the diesel emergency would be used during a power outage from Tacoma Power in order to keep the LNG plant operating. Why it is included under the category "Peak Shaving" in Table 4-5? Given that this diesel will eventually be burned, are the GHG emissions included in end use? If so, where?

Power LNG Vaporizer – Peak Shaving: Is this electricity to be used to power the LNG vaporizer for peak shavings? If so, why is it categorized as "Trucking" in Table 4-5, instead of being included in "Electricity"? (More generally, throughout this document, does "power" refer only to electricity?)

Gig Harbor Diesel truck fuel – Please confirm that this is the diesel required for transporting LNG to the Gig Harbor LNG peak-shaving facility. Why is it categorized as "Tote Marine vessels" in Table 4-5?

Direct LNG Plant
Vaporizer – Peak Shaving: Does this refer to electricity used to operate the vaporizer for peak shaving? Or LNG emitted during peak shaving?

End use LNG
Diesel peak shaving: What does this represent, as our understanding is that diesel would be eliminated from peak shaving in both Scenarios A and B? Does this mean LNG used to offset diesel peak shaving?

TOTE Marine Vessels: Please confirm that methane slippage was represented in the emissions analysis for the TOTE vessels and if so, what slippage rate was used?

Other Marine Vessels LNG (By Bunker Barge): Please confirm that methane slippage was represented in the emissions analysis for the Non-TOTE marine vessels, and if so, what slippage rate was used?

Section 4.4, Table 4-4, Page 4-10
Total Upstream Emissions
No Peak Shaving – Diesel Dual Fuel: Please confirm that this is the upstream emission from diesel used in peak shaving. If it **is** peak shaving, why is it categorized as "**No** peak shaving?" (Note: this is included in "Peak Shaving" in Table 4-5.)

0345-3 11. LCA Inputs and Assumptions - General
0345-4 11. LCA Inputs and Assumptions - General
0345-5 19. LCA Inputs and Assumptions - End Use
0345-6 17. LCA Inputs and Assumptions - Peak Shaving
0345-7 17. LCA Inputs and Assumptions - Peak Shaving
0345-8 14. LCA Inputs and Assumptions - Leakage/Slippage
0345-9 14. LCA Inputs and Assumptions - Leakage/Slippage
0345-10 17. LCA Inputs and Assumptions - Peak Shaving

Section 4.5, Table 4-5, Page 4-12
Although this table compares the items in Tables 4-3 and 4-4, many of the category names in this table are different from those in Table 4-3 and Table 4-5. Please clearly explain linkages between this table and the previous two and use the same category names where possible.

Appendix B

Section 2.1, Cut-off criteria, Page 8
To clarify the emission categories that emit less than 1%, does "direct Tacoma LNG plus WTT and downstream emissions," mean the entire CO2e budget, as shown Tables 4-3 and 4-4? In other words, is this threshold: 1% of 727,536 tonnes/year CO2e scenario A no action, 1% of 1,443,219 scenario B no action, 1% of 687,639 scenario A proposed action, or 1% of 1,386,514 scenario B proposed action?

Given that the 1% cut-off threshold represents a major fraction of the 4% or 5% greenhouse gas reductions, please identify all the components for which the 1% criteria are used and the likely percentage values for those components.

Sections 2.2 – 2.4, Pages 9 - 11, 14 - 15, 18, 19, 21, 22, 24, 25
These pages all have incomplete/TBD data. We recognize that this is the methodology section and so it does not contain all of the final results, but it should be populated with the correct values for clarity. Please supply this incomplete data. Can you also confirm that in all of these places where there is missing data, that it has been properly populated in the results section and accordingly in the model itself?

Section 2.2.3, Page 19
Regarding footnote 16: "Methane from onboard LNG storage tanks may escape during its use. Data on methane losses has been requested." Did you receive this data from PSE? If so, what were the leakage rates and were they included in the model?

Appendix C

Section 1.5, Page 22: "Generally, all of the LCA models described here produce the same life cycle GHG results with the same input assumptions," please provide a reference for this statement.

Section 2.1, Page 27
System Boundary. Please clarify if Scope 3 emissions include rail and truck diesel emissions for sand and water used in fracking and if not, why not, as these are part of the extraction operations. We recognize that both oil and gas are derived from fracking, but that the percentage of oil wells that are currently sources to the No Action Alternatives for scenarios A and B are not all fracked wells. In particular, 40% of the diesel comes from the Alaska North

0345-11 9. LCA Methodology
0345-12 11. LCA Inputs and Assumptions - General
0345-13 11. LCA Inputs and Assumptions - General
0345-14 10. LCA Calculations
0345-15 14. LCA Inputs and Assumptions - Leakage/Slippage
0345-16 11. LCA Inputs and Assumptions - General
0345-16 cont'd 16. LCA Inputs and Assumptions - Hydraulic Fracturing

Slope where conventional oil wells are used, whereas the B.C.-based gas is 85% - 98% derived from fracking wells.

Section 2.2, Page 30: It is stated here and several other places that a sensitivity analysis was performed with a variety of mixes for electric. Where are the results of the sensitivity analyses shown?

Section 2.2, Page 31. Power Generation and WTT Upstream Life Cycle Emissions
Please give a reference for the statement that the electricity load from the Tacoma LNG project will not result in an expansion of power generation resources.

Section 2.4.1, Page 41, Table 2.5
Is the natural gas composition an average distribution determined from the Williams pipeline?

Section 3.1, Page 54: It says here WA average mix was used for power generation for construction, for the upstream emissions. Is the WA average mix used for **all** electricity estimates?

Section 3.2.1, page 56
Please confirm that the analysis uses a methane leakage rate of 0.32% from GHGenius 4.03. What are the references for that leakage rate? Why was an outdated version of GHGenius used, which is no longer available? Why wasn't the newer version used (Version 5, available at https://ghgenius.ca/index.php/downloads), with an updated methane leakage rate?

Section 5, page 71
The SEIS states, "Note that the emissions from the LNG facility plus upstream emissions are higher than those for the no action alternative. However, the carbon content of LNG results in lower end use emissions; so the net life cycle GHG emissions are reduced under most situations." Under what conditions are the emissions not reduced and what are the values/results under those conditions?

Section A, page 88, and elsewhere where example calculations are shown
Boxed example calculations: Please replace the values here, which are "illustrative," with actual values used. What is E_NL (last equation in box)? We require example calculations that clearly link to what is shown on page 87. For example, each example calculation could refer to one term inside the brackets in Equation 5.

Direct Emissions from LNG Facility Operations, and other example calculations: Please revise example calculations so that they are accurate and comprehensible. For example, here the units do not work out to g C / mmBtu (but rather to just g). Furthermore, we do not get the same result for this example. (We assume what is shown here is the result of an operation that then has further values subtracted and then multiplied. Since this makes the math technically incorrect, we are not sure, but see no other way to interpret this). Since these errors limit our ability to perform a full review of the draft SEIS, we request corrected example calculations throughout the draft SEIS.

0345-17 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0345-18 10. LCA Calculations
0345-19 19. LCA Inputs and Assumptions - End Use
0345-20 15. LCA Inputs and Assumptions - Natural Gas Properties
0345-21 11. LCA Inputs and Assumptions - General
0345-22 9. LCA Methodology
0345-23 10. LCA Calculations
0345-24 10. LCA Calculations
0345-25 10. LCA Calculations

Section A.3, page 95, Table A.10, Inventory of Fugitive Leak Components
Please provide references for this table.

Section B.1, Page 102 and References page 122:
Please provide the reference for the number 4.65 billion cubic meters from all oil and gas operations, and total natural gas production in BC of 1,801 billion cubic feet (should the leakage be 4.65 billion cubic *feet*? Otherwise the math giving 0.26% does not work out). Please note that the reference "Province of British Columbia, 2018" is a web site and relevant information could not be found. Please provide the report referenced.

Section B.1, Page 103, Table B.3:
GHGenius 2016, BC: Please provide this reference. Is this GHGenius v. 4.03, and was that version used throughout the analysis?

BC 2017: We cannot find this reference; please provide it.

Table C.1. Page 117:
The natural gas column indicates placeholder values and data requested. Were the values received from PSE and if so, what are they?

Appendix C, Page 118: Please confirm that 2007 UN IPCC AR4 100-year GWP values were used for methane and nitrous oxide throughout the model.

The analysis needs to include the most up-to-date GWP values (AR5), and also include both the 20 and 100 year values, as well as the newer values of Etminian et al. 2016. In calculating LCA for LNG, the Department of Energy analysis includes AR5 100 year and 20 year (see Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, May 29, 2014 DOE/NETL-2014/1649, available at https://www.energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf). Please provide the greenhouse gas emissions for the AR5 100 year and 20 year GWPs, as well as for the newer values of Etminian et al. 2016.

General Comments:

Uncertainty Analysis - Given that 1) fugitive methane emissions were central to this analysis, 2) BC methane emissions are highly uncertain, and 3) the greenhouse gas CO2e reduction was modest (5% and 4% for scenarios A and B), and 4) the report states that various scenarios were examined, why weren't the results of an uncertainty analysis given? The uncertainty analysis should consider sources of uncertainty such as:

- Exclusion of contributions less than 1%. Given a total difference of only 4 or 5%, a 1% threshold for ignoring a contribution to CO2e seems much too high. Please detail the combined estimated percent ignored so it can be determined how it compares to 5%.

0345-26 9. LCA Methodology
0345-27 10. LCA Calculations
0345-28 9. LCA Methodology
0345-29 9. LCA Methodology
0345-30 10. LCA Calculations
0345-31 12. LCA Inputs and Assumptions - Global Warming Potential Value
0345-32 12. LCA Inputs and Assumptions - Global Warming Potential Value
0345-33 12. LCA Inputs and Assumptions - Global Warming Potential Value

- Uncertainty due to use of an outdated value for the 100-year GWP of methane (AR4). Please provide additional analyses for the more-accurate updated value from AR5 (28) as well as the current value from Etminan et al. 2016 (32).
- Use of the 20-year GWP. Please provide additional analysis using the 20-year GWP.
- The currently-available version of GHGenius uses a methane leak rate of 0.46%. How does the analysis change using this value?

Review & Process - Finally, we have a few questions about the overall review and process as follows:

- Can you please also articulate the internal PSCAA review process for the SEIS? Does PSCAA have staff who are able to and have reviewed the SEIS for accuracy and what are the results of those reviews?
- Regarding the overall SEIS process and given the issues raised, we would like to see a fully edited and updated document that incorporates these concerns and then another public comment period to provide an additional review. The recent UN IPCC report highlighted the critical importance of our rapidly addressing our greenhouse gas emissions, so getting this report right is of the utmost importance. We hope you will agree and grant this additional comment period.

Thank you for requiring this SEIS to quantify the greenhouse gas emissions of the LNG plant, and to help keep our air clean. We appreciate and look forward to the answers to our questions.

Penny Rowe

Dr. Penny M. Rowe

Dr. Todd Hay

References

Etminan, M., G. Myhre, E. J. Highwood, and K. P. Shine (2016), Radiative forcing of carbon dioxide, methane, and nitrous oxide: A significant revision of the methane radiative forcing, *Geophys. Res. Lett.*, 43, 12,614–12,623, doi: 10.1002/2016GL071930.

0345-33 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
0345-34 2. Determination of the SEIS Scope
0345-35 12. LCA Inputs and Assumptions - Global Warming Potential Value

Carole: Thank you. Penny Rowe?

Penny: Hi. I'm Dr. Penny Rowe, a Tacoma resident and a Puget Sound energy rate payer. I want to thank you for requiring the SEIS and for keeping our air clean. As a climate scientist, I conducted an independent review of the DSEIS in my free time.

[02:14:05] I'm asking you to deny a permit for this plant because the DSEIS fails to show that the plant will reduce greenhouse gases. At a minimum, the DSEIS requires major revisions, and the comment period needs to be extended to give us more time to review it. The DSEIS concludes that greenhouse gases will be reduced by four or five percent. Five percent is a small number. For two values to be considered different, scientific practice dictates that they must differ by more than their uncertainties. However, uncertainties were not given. And it is evident that uncertainties are large, particularly for the upstream methane leakage rate.

The DSEIS has additional problems. It cites references that cannot be found. It fails to use current values publishes in the scientific literature. It fails to reference relevant studies. And it fails to use the most current version of the model for the lifecycle analysis.

[02:15:00] Data is indicated as missing in numerous places, and incorrect units make mathematical calculations difficult or impossible to follow. I think that if corrected to use the best available scientific methods, data, and models, it is likely that the analysis would show that greenhouse gas emissions would increase relative to the no action alternative. I also just wanted to point out that Puget Sound Energy customers will not receive seven percent of the LNG. They will receive seven percent of the LNG for ten years. Over a 40 year lifetime of the plant, that's only 1.75%. Thank you very much for your time.

1203

1203-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1203-2 22. General Opposition
1203-3 9. LCA Methodology
1203-4 10. LCA Calculations
1203-5 3. Outside of SEIS Scope

From: Penny Rowe
To: Public Comment
Cc: Todd Hay
Subject: questions about DSEIS for PSE LNG
Date: Saturday, October 27, 2018 1:02:38 PM

October 27th, 2018

Dear Puget Sound Clean Air Agency,

We have reviewed the draft SEIS for greenhouse gas emissions for the PSE LNG plant in Tacoma. We appreciate your taking the environmental impacts of this project seriously and for requiring the completion of this GHG SEIS. We are writing as we have a number of technical questions concerning the project that are preventing us from completing a thorough analysis of the draft SEIS. Given the serious and extensive nature of the concerns that we have identified, and given the numerous places where data is incomplete, we respectfully request answers to these questions and then the re-issuance of a new draft SEIS, followed by another 30-45 day public comment period. We are not able to adequately analyze the SEIS in its current state.

A copy of this letter has also been sent by mail.

Our questions are as follows:

Main Document

Section 2.3.5, Page 2-4:
It is stated that ship bunkering would occur for a total of 8 hours per week. Please confirm that this is for Tote Maritime only and does not include the potential future maritime customers. What are the estimates for the non-Tote maritime vessels?

Section 3.3.1, Page 3-5:

1) While we recognize that PSE currently uses diesel for peak shaving operations, please explain why is it assumed that all peak shaving would be supplied with diesel fuel. Please detail any other options that PSE has considered for meeting peak shaving demands (e.g. purchase of electricity from Tacoma Power, purchase of batteries, development of other renewables, and conservation). Please also detail any programs that PSE is part of (such as Green Energy programs) that could potentially be used for peak shavings.

2) Please explicitly state the instantaneous power, in MW, and energy, in MWh, required to meet peak shaving demands. What is the source for the estimate that 5.89 million gallons of diesel per year is required for peak shaving?

3) Later in the document (Appendix C, p. 16, Section 1.3; Appendix C, p. 24, Section 2; Appendix C, p. 35, Section 2; Appendix C, p. 60, Section 3.2.3; Appendix C, p. 70, Section 5; Appendix C, p. 74, Section 5;) it is stated that peak shaving would only occur for 10 years; is that the assumption here as well? Please confirm that this is a valid assumption.

Section 4.3.2, Page 4-7
Major clarifications are needed for Tables 4-3, 4-4 and 4-5 in order to understand the analysis. Please provide a table or figure that defines every term used, specifies what energy type it refers to (electric, diesel, LNG, or other) and clarifies which analysis method in the appendix was used to determine the GHG emissions. Also, please use terms in Table 4-5 that are identical to terms used in Tables 4-3 and 4-4, or where that is not possible, include a footnote to the table explaining them.

Table 4-3, Page 4-8
Upstream Life-cycle
Power LNG Production. Please explain what this is. Does this refer to electricity used to run the LNG plant? Is this the electricity that will be purchased from Tacoma Power, which the models assume will "WA ave mix?" (This appears in Table 4-5 under the category "electricity").

Diesel Emergency. Please confirm if the diesel emergency would be used during a power outage from Tacoma Power in order to keep the LNG plant operating. Why it is included under the category "Peak Shaving" in Table 4-5? Given that this diesel will eventually be burned, are the GHG emissions included in end use? If so, where?

Power LNG Vaporizer – Peak Shaving: Is this electricity to be used to power the LNG vaporizer for peak shavings? If so, why is it categorized as "Trucking" in Table 4-5, instead of being included in "Electricity"? (More generally, throughout this document, does "power" refer only to electricity?)

Gig Harbor Diesel truck fuel – Please confirm that this is the diesel required for transporting LNG to the Gig Harbor LNG peak-shaving facility. Why is it categorized as "Tote Marine vessels" in Table 4-5?

Direct LNG Plant
Vaporizer – Peak Shaving: Does this refer to electricity used to operate the vaporizer for peak shaving? Or LNG emitted during peak shaving?

End use LNG
Diesel peak shaving: What does this represent, as our understanding is that diesel would be eliminated from peak shaving in both Scenarios A and B? Does this mean LNG used to offset diesel peak shaving?

TOTE Marine Vessels: Please confirm that methane slippage was represented in the emissions analysis for the TOTE vessels and if so, what slippage rate was used?

Other Marine Vessels LNG (By Bunker Barge): Please confirm that methane slippage was represented in the emissions analysis for the Non-TOTE marine vessels, and if so, what slippage rate was used?

Section 4.4, Table 4-4, Page 4-10
Total Upstream Emissions
No Peak Shaving – Diesel Dual Fuel: Please confirm that this is the upstream emission from diesel used in peak shaving. If it **is** peak shaving, why is it categorized as "**No** peak shaving?"

(Note: this is included in "Peak Shaving" in Table 4-5.)

Section 4.5, Table 4-5, Page 4-12
Although this table compares the items in Tables 4-3 and 4-4, many of the category names in this table are different from those in Table 4-3 and Table 4-5. Please clearly explain linkages between this table and the previous two and use the same category names where possible.

Appendix B

Section 2.1, Cut-off criteria, Page 8
To clarify the emission categories that emit less than 1%, does "direct Tacoma LNG plus WTT and downstream emissions," mean the entire CO2e budget, as shown Tables 4-3 and 4-4? In other words, is this threshold: 1% of 727,536 tonnes/year CO2e scenario A no action, 1% of 1,443,219 scenario B no action, 1% of 687,639 scenario A proposed action, or 1% of 1,386,514 scenario B proposed action?

Given that the 1% cut-off threshold represents a major fraction of the 4% or 5% greenhouse gas reductions, please identify all the components for which the 1% criteria are used and the likely percentage values for those components.

Sections 2.2 – 2.4, Pages 9 - 11, 14 - 15, 18, 19, 21, 22, 24, 25
These pages all have incomplete/TBD data. We recognize that this is the methodology section and so it does not contain all of the final results, but it should be populated with the correct values for clarity. Please supply this incomplete data. Can you also confirm that in all of these places where there is missing data, that it has been properly populated in the results section and accordingly in the model itself?

Section 2.2.3, Page 19
Regarding footnote 16: "Methane from onboard LNG storage tanks may escape during its use. Data on methane losses has been requested." Did you receive this data from PSE? If so, what were the leakage rates and were they included in the model?

Appendix C

Section 1.5, Page 22: "Generally, all of the LCA models described here produce the same life cycle GHG results with the same input assumptions," please provide a reference for this statement.

Section 2.1, Page 27
System Boundary. Please clarify if Scope 3 emissions include rail and truck diesel emissions for sand and water used in fracking and if not, why not, as these are part of the extraction operations. We recognize that both oil and gas are derived from fracking, but that the percentage of oil wells that are currently sources to the No Action Alternatives for scenarios A and B are not all fracked wells. In particular, 40% of the diesel comes from the Alaska North Slope where conventional oil wells are used, whereas the B.C.-based gas is 85% - 98% derived from fracking wells.

Section 2.2, Page 30: It is stated here and several other places that a sensitivity analysis was performed with a variety of mixes for electric. Where are the results of the sensitivity analyses shown?

Section 2.2, Page 31. Power Generation and WTT Upstream Life Cycle Emissions
Please give a reference for the statement that the electricity load from the Tacoma LNG project will not result in an expansion of power generation resources.

Section 2.4.1, Page 41, Table 2.5
Is the natural gas composition an average distribution determined from the Williams pipeline?

Section 3.1, Page 54: It says here WA average mix was used for power generation for construction, for the upstream emissions. Is the WA average mix used for **all** electricity estimates?

Section 3.2.1, page 56
Please confirm that the analysis uses a methane leakage rate of 0.32% from GHGenius 4.03. What are the references for that leakage rate? Why was an outdated version of GHGenius used, which is no longer available? Why wasn't the newer version used (Version 5, available at https://ghgenius.ca/index.php/downloads), with an updated methane leakage rate?

Section 5, page 71
The SEIS states, "Note that the emissions from the LNG facility plus upstream emissions are higher than those for the no action alternative. However, the carbon content of LNG results in lower end use emissions; so the net life cycle GHG emissions are reduced under most situations." Under what conditions are the emissions not reduced and what are the values/results under those conditions?

Section A, page 88, and elsewhere where example calculations are shown
Boxed example calculations: Please replace the values here, which are "illustrative," with actual values used. What is E_NL (last equation in box)? We require example calculations that clearly link to what is shown on page 87. For example, each example calculation could refer to one term inside the brackets in Equation 5.

Direct Emissions from LNG Facility Operations, and other example calculations: Please revise example calculations so that they are accurate and comprehensible. For example, here the units do not work out to g C / mmBtu (but rather to just g). Furthermore, we do not get the same result for this example. (We assume what is shown here is the result of an operation that then has further values subtracted and then multiplied. Since this makes the math technically incorrect, we are not sure, but see no other way to interpret this). Since these errors limit our ability to perform a full review of the draft SEIS, we request corrected example calculations throughout the draft SEIS.

Section A.3, page 95, Table A.10, Inventory of Fugitive Leak Components
Please provide references for this table.

Section B.1, Page 102 and References page 122:

Please provide the reference for the number 4.65 billion cubic meters from all oil and gas operations, and total natural gas production in BC of 1,801 billion cubic feet (should the leakage be 4.65 billion cubic *feet*? Otherwise the math giving 0.26% does not work out). Please note that the reference "Province of British Columbia, 2018" is a web site and relevant information could not be found. Please provide the report referenced.

Section B.1, Page 103, Table B.3:
GHGenius 2016, BC: Please provide this reference. Is this GHGenius v. 4.03, and was that version used throughout the analysis?

BC 2017: We cannot find this reference; please provide it.

Table C.1. Page 117:
The natural gas column indicates placeholder values and data requested. Were the values received from PSE and if so, what are they?

Appendix C, Page 118: Please confirm that 2007 UN IPCC AR4 100-year GWP values were used for methane and nitrous oxide throughout the model.

The analysis needs to include the most up-to-date GWP values (AR5), and also include both the 20 and 100 year values, as well as the newer values of Etminian et al. 2016. In calculating LCA for LNG, the Department of Energy analysis includes AR5 100 year and 20 year (see Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, May 29, 2014 DOE/NETL-2014/1649, available at https://www.energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf). Please provide the greenhouse gas emissions for the AR5 100 year and 20 year GWPs, as well as for the newer values of Etminian et al. 2016.

General Comments:

Uncertainty Analysis - Given that 1) fugitive methane emissions were central to this analysis, 2) BC methane emissions are highly uncertain, and 3) the greenhouse gas CO2e reduction was modest (5% and 4% for scenarios A and B), and 4) the report states that various scenarios were examined, why weren't the results of an uncertainty analysis given? The uncertainty analysis should consider sources of uncertainty such as:

- Exclusion of contributions less than 1%. Given a total difference of only 4 or 5%, a 1% threshold for ignoring a contribution to CO2e seems much too high. Please detail the combined estimated percent ignored so it can be determined how it compares to 5%.

- Uncertainty due to use of an outdated value for the 100-year GWP of methane (AR4). Please provide additional analyses for the more-accurate updated value from AR5 (28) as well as the current value from Etminan et al. 2016 (32).

- Use of the 20-year GWP. Please provide additional analysis using the 20-year GWP.

- The currently-available version of GHGenius uses a methane leak rate of 0.46%. How does the analysis change using this value?

Review & Process - Finally, we have a few questions about the overall review and process as follows:

- Can you please also articulate the internal PSCAA review process for the SEIS? Does PSCAA have staff who are able to and have reviewed the SEIS for accuracy and what are the results of those reviews?

- Regarding the overall SEIS process and given the issues raised, we would like to see a fully edited and updated document that incorporates these concerns and then another public comment period to provide an additional review. The recent UN IPCC report highlighted the critical importance of our rapidly addressing our greenhouse gas emissions, so getting this report right is of the utmost importance. We hope you will agree and grant this additional comment period.

Thank you for requiring this SEIS to quantify the greenhouse gas emissions of the LNG plant, and to help keep our air clean. We appreciate and look forward to the answers to our questions.

Dr. Penny M. Rowe
Dr. Todd Hay

References

Etminan, M., G. Myhre, E. J. Highwood, and K. P. Shine (2016), Radiative forcing of carbon dioxide, methane, and nitrous oxide: A significant revision of the methane radiative forcing, *Geophys. Res. Lett.*, 43, 12,614–12,623, doi: 10.1002/2016GL071930.

1540-1 3. Outside of SEIS Scope
1540-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Marcie Rubardt
To: Public Comment
Subject: comment on DSEIS for PSE LNG tank
Date: Tuesday, October 30, 2018 5:24:43 PM

I am writing to register my concern about the proposed PSE permit for a large LNG tank at the Port of Tacoma. I am concerned that:

1. The possibility of explosion in such proximity to large population centers is potentially a disaster. This possibility is exacerbated by the earthquake and tsunami potential in this region.
2. The potential for even minor methane leaks at every point along the distribution potentially contributing significantly to greenhouse gases. This makes natural gas potentially as damaging as energy sources, such as coal, that are more commonly considered to be “dirty”. This impact is worse with fracking - the source of most current LNG growth in supply.
3. Even though this is represented a “bridge” solution for energy, the establishment of LNG infrastructure and markets essentially approves “backing off” on the push to find alternatives. Instead, it is time to push forward with cleaner alternative energy sources and add investment in these directions.
4. PSE is a for-profit corporation owned by Canadian interests. The current CEO heads the board of the AmericanGas Association, indicating considerable potential for corruption and self interest in expanding LNG markets. In addition, PSE has already received considerable tax breaks and public subsidy, including passing of capital costs to PSE rate payers while enhancing profit.

In summary, I feel like this proposal is problematic on many fronts, the permit process has been messy an incomplete with multiple conflicts of interest at play, and it essential that the PSCAA move forward VERY cautiously, taking every opportunity to exhaustively explore cleaner and more reliable alternatives to this tank.

Thanks for your consideration.

Marcie Rubardt

Marcie Rubardt
206-463-5557
13020 SW 248th St.
Vashon, WA 98070
skype: marcie.rubardt

1548-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1548-2 13. LCA Inputs and Assumptions - Natural Gas Source
1548-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1548-4 13. LCA Inputs and Assumptions - Natural Gas Source
1548-5 3. Outside of SEIS Scope

From: Deborah Rudnick
To: Public Comment
Subject: Comment on the proposed Tacoma LNG facility
Date: Wednesday, November 21, 2018 10:34:36 PM

Dear PSCAA reviewers

I am writing today to provide comments on the SEIS for the proposed Tacoma LNG terminal.

Your agency works every day to protect our public health, improve air quality, and reduce our region's contribution to climate change. This SEIS is seriously flawed and does nothing to convince me that the proposed project will support any of your objectives- in fact, were this SEIS accurate and comprehensive, I believe it would show clearly that this proposal is not in our region's interest nor consistent with your Agency mission to protect our health and air quality. Serious issues with this SEIS include:

-This SEIS looks only at the 100 year GWP of the methane associated with this project. As methane is a far more potent near-term GHG, a 20-year timeframe for measuring impacts would show that this project has far higher GWP. And because the next few decades represent an absolutely critical window during which we must cut fossil fuel emissions sharply, this is the timeframe over which these impacts need to be considered.

-This draft incorrectly assumes that the BC gas used would reduce GHG emissions, conclusions that are based on models or self-reporting by industry. These conclusions are not verified, and therefore we cannot trust that their conclusions are robust or accurate. And there is substantial credible and recent evidence to support that methane leak rates associated with these wells are far higher than reported. Without verification, it is irresponsible to rely on this data to draw conclusions about the actual GHG emissions of this fuel source.

-This report assumes all gas will be brought in from BC; how does your Agency intend to monitor and verify that this will be the case, and how do we know that sources of gas with even higher leak rates will not be tapped?

Beyond all of these very serious concerns, there is the overriding problem that LNG is fundamentally not a fuel source that we should be developing in the face of the critical needs we have to transition from fossil fuels to mitigate climate change. The Department of Ecology for Washington State has some substantive GHG emission reduction goals, including:

- Reduce overall GHG emissions to 1990 levels by 2020 – that's ONLY 2 years away.
- Reduce overall GHG emissions to 25 percent below 1990 levels by 2035.
- And, finally to reduce emissions to 50 percent below 1990 levels by 2050.

Will this facility do anything to help us achieve these goals? Quite the opposite. Please DENY the final Order of Approval for PSE's LNG Facility in Tacoma. To truly reduce GHG emissions we need our energy companies to transition entirely off of fossil fuels. There is no other way for Washington State to meet its GHG emission reduction targets.

Sincerely,

Deborah Rudnick
Bainbridge Island, WA

1452-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Catherine Ruha
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 9:38:05 PM

To Whom It May Concern,

The SEIS is Using Outdated Methane Global Warming Potential Value – The SEIS did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Puget Sound Energy should not have creating dirtier air as one of its goals. My health and the health of all in the Puget Sound region should be of primary concern. There are cleaner ways to produce energy.

Thank you,
Catherine Ruha

1541 NE 91st Street
Seattle, WA, 98115
ruhac@outlook.com
206-355-5054

0350-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Malcolm Russell

Address or email mmrussell35@hotmail.com

I served 16 years as a planning commissioner for both the city of tacoma and for Pierce County. Ive been dedicated to a better community. I support the LNG Plant and the conclusion of the EIS. The LNG permit from PSCAA should be granted.

Thank you!

1835-1 22. General Opposition

From: Dave Russell
To: Public Comment
Subject: Tacoma LNG SEIS Project Public Comment
Date: Wednesday, October 31, 2018 11:48:03 AM

Dave Russell
4507 105fh Ave NE
Kirkland, WA 98033

October 31, 2018

Dear Carole J. Cenci,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct a more rigorous analysis.

Sincerely,
Dave Russell

1255-1 22. General Opposition

From: Susan Ryan
To: Public Comment
Subject: Public Comments for PSE - LNG Facility Tacoma Draft SEIS
Date: Wednesday, November 21, 2018 12:41:28 PM
Attachments: PSE Draft SEIS Public Commnet Nov 21 2018.pdf

Please see comments attached.

Thank you

Date: November 21, 2018

To: Puget Sound Clean Air Agency
Att: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

From: Susan Ryan
Tacoma, WA 98406
Susanryan.nenc@gmail.com

Dear PSCAA,

Let me first say I thank you for requiring a Supplemental Environmental Impact Statement to begin with. I participated in the meetings requesting it be done. However now that it has been done I am gravely disappointed in the how the draft was reached and not what I would expect from a professional public organization that should be seeking and using the best possible data. I am confident you can do better.

On October 30th I attended the Public Hearing and stayed until 10:00pm waiting for my name to be called but I missed out. I attended this with a friend and we sat in the back of the auditorium observing the proceedings. We were impressed by your abilities to keep an even keel and patience with the long day and passionate voices crying out to be heard.

We noticed a distinct difference in the public comments. Those from industry and business groups set to personally benefit from the expansion of LNG into Tacoma and beyond. They all supported the project and your draft report. A common theme was “I’m an environmentalist and I believe in science” used in a way to make them sound informed and caring. One young man newly employed by industry referenced how nice Tacoma is now with all the gentrification. Oh my, my friend and I thought when we heard that.

A bulk of the other comments opposing the LNG facility and Draft SEIS were from persons educated in the sciences, professors, volunteers for environmental groups, tribal members and activists not looking for their own monetary interests but for the interests of all that live in breathe. I thank them for their efforts because nothing ever gets done for the better without activists leading the way trying to make a difference in a world where profit and excessive greed often trumps common sense and doing the right thing. We need to turn this train wreck around and stop expanding and extracting fossil fuels. We have weekly reminders of climate change and hardship around the globe.

While environmental activists can be louder and are willing to call out bluffs the industry group huddled around each other more quietly snickering and laughing while others were up giving testimony. Sitting in the back of the room behind them was eye opening as many appeared to be employees with their employers.

I do not claim to be an expert on science and data but I do know that what once was believed about fracking and the impact on the environment has changed. Several years ago before the LNG project came on line it was reported that data collected during the recession gave an inaccurate picture. Consumption was down at this time leading to a belief that impact was lower and that LNG was a favorable direction. We now know that was wrong.

I will let the educated individuals speak to all the finer details and flaws found in the draft SEIS. Too many holes in need of repair.

As someone that remembers collecting cans as a 10 year old near the Mississippi river in Minneapolis, for the first Earth Day, our environment has always been import to me. I'll never forget learning that plastic never goes away and there is only so much oil in the ground.

I have lived long enough to know nothing is safe, accidents happen, politicians are too easily influenced to look the other way and public agencies are under increased pressure to produce reports and make decisions that have favored the fossil fuel industry for far too long.

I never knew until last year that PSCAA only measures air particulates and not all the cumulative gases and chemicals I smell coming from the Port. I had a blind faith it must be safe. Silly me, no wonder I would get a headache when traveling back midweek from North East Tacoma down the hill to cross the Port.

The burning sensation in my nostrils was very unpleasant. Or, the smells early Sunday morning in my backyard near University of Puget Sound a location which does not get prevailing winds coming off the Port, those go towards East Tacoma and tribal land.

The Puget Sound Clean Air Agency is the only stop gap left. Tacoma has always been low hanging fruit, the recent Methanol debacle and now this LNG mistake is not a coincidence.

I have been a PSE customer for 21 years. We have never run into a situation where PSE had a shortage. I called PSE a month ago to find out if the gas coming into my home is fracked. I stayed on the line for about 20 minutes while the rep tried to find me an answer. I told him I don't want fracked gas in my home. He assured me he would call me back when he had an answer. He never did. I believe I know the answer to the question. I will be starting to look for a new heating source.

We must stop creating new fossil fuel opportunities. And those Union dudes are going to be out of jobs regardless in the near future just like the rest of us.

It is really hard to believe that this Puget Sound Energy – LNG Facility can pass permitting if strict and rigorous analysis is used.

Sincerely,
Susan Ryan

Steve: Next up is Holly Rydel Kelly.

[03:35:00]

Holly: Hi. My name is Holly, and I sat through all of the first session. And I thought about submitting a written comment. But I actually wanted to see your faces and you to see my face. Before even getting into the environmental and economic concerns, this LNG facility is being built on tribal lands without their consultation or support. I am broken hearted at the repeated and persistent breaking of already exploitive treaty agreements. I'm a seventh generation Pierce County resident. My children who are in college now are the eighth. I want nothing more than to see Tacoma thrive. I want jobs and a robust economy for now and into the future.

I am for sustainable jobs and a clean environment. But this SEIS doesn't even meet clean air standards. And the short sighted focus of immediate economic benefits does not take into account the long term economic damage of pollution and reliance on fossil fuels.

[03:36:05] The tide flats and our Asarco site are notorious for their oppressive pollution, and no amount of jobs they provide can make up for the economic depression of contaminated soil, the Tacoma aroma, and toxic waters. The waters here are not just sacred, but they're the life of our community. Since before written history, before the arrival of capitalism, our Puget Sound waterways have been the life of this region from clean drinking water, food, ritual, highways for trade. It is essential that we preserve the air, soil, and water of our community. PSE touts the LNG facility as clean energy reducing greenhouse gas emissions.

Yet, a closer look shows that it is only a four to five percent improvement in greenhouse gas emissions over a hundred years than not building it. But it is way more of a polluter, in its initial few decades, i.e., right now, and only has a life span of 40 years anyway.

[03:37:00] I'm not a scientist, so these are my layperson observations in assessing what I've read. But I beg of you to listen to the scientists who have testified prior to me. I ask for Tacoma, for you, to you to not pander to corporations' stealing of tribal lands and help us invest in real green energy effective now and into the future. As our Clean Air Agency, I beg of you to use your powers to protect the people of Puget Sound.

1145

1145-1 3. Outside of SEIS Scope

1592-1 3. Outside of SEIS Scope

From: David and Gwen
To: Public Comment
Subject: LNG vs crude
Date: Tuesday, October 30, 2018 10:22:57 AM

This issue is more complex that it would first seem. According to this research as presented in **The Economist**, the overall death toll is less from the effects of crude than the effects of liquid natural gas.

https://www.economist.com/business/2018/10/27/sulphur-emissions-rules-for-shipping-will-worsen-global-warming

David and Gwen Sailer, Browns Point

Steve: Thank you. Next up is Rene Cournoyer. Josh Clearman?

Josh: Thank you all. And thank you for hearing us today.

[04:58:00] And thank you to my fellow folks here. And welcome to everyone from out of town. My name is Josh Clearman. I live in Tacoma. And I've lived here for six years with my kids. And before this, I lived in Key West, Florida where I was the co-author of the Climate Action Plan. My students and I installed the first wind tide grid tide turbine in the Florida Keys. We installed a 25,000 watt solar array. And I'm coming before you to fully support the LNG project. It is natural gas, as people have said, definitely has its problems. But I want to give another number out there, and it's 365.

That's the number of days that myself and my co-workers on Hilltop and my kids breathe bunker air. As you and your authority for Puget Sound air quality, I ask you to get the bunker fuel air out of the Puget Sound. Thank you.

[04:59:00]

Steve: So, before I get to the next five, just a heads up, the group after that will be LaDonna Robertson, Joanna Shoetler, Bret Stein, Dave Gering, and Norma Ramirez. So, next up, and I'm probably not going to do this justice. Saiyare Refaei. Sorry, if you'd state your name, so we can get it right.

Saiyare: Saiyare Refaei. Thank you for the opportunity to speak. Thank you for those who sacrificed to be here today. I send gratitude to the Puyallup Tribe of Indians whose land we currently occupy as a product of colonization and genocide.

[05:00:02] They continue to lead our justice work today. I would also like to lift up the immigrant detainees in the northwest detention center in Tacoma tide flats who do not get a say or maybe even know about the LNG plant that could have overtly harmful effects, given that their current emergency protocol is to stay place. My name is Saiyare Refaei, and I work at the Diversity Center at Pacific Lutheran University as the coordinator for sustainability integration. I am also a community artist. And this year, I was appointed to the city of Tacoma's Commission on Immigrant and Refugee Affairs.

Yet, I come to you today as a concerned, exhausted but not defeated, Tacoma resident. I want to share a memory. The evening

on July 18, 2017, I joined friends in the Tacoma tide flats to stand with the Puyallup People and community members, elders, families, and children. We held space unarmed peacefully and delayed unlawful construction for three hours through marching, song, and prayer.

[05:01:03] I was also taking pictures to share with those who were unable to attend. By the third hour, I remember Puyallup Tribal member, Dakota Case, coming to the large group and telling us the police are starting to get hostile. To please not do anything disrespectful. We held space long enough today, and we can come back tomorrow. As a couple of my friends and I were returning to where we had parked, we noticed a tinted, unmarked minibus that an officer entered suited in riot gear. My friend overheard the officer say, "Not today, guys."

I, frantically, messaged a couple of friends who were still in the larger group to make sure that they knew about the militarized presence that was there and hoped that they would get home safe. In the coming days, I learned that PSE was paying Fife police to be out there. Not for the protection of concerned community members, but to protect their profits and project that they were unlawfully constructing.

[05:02:02] Every time I see a PSE logo or greenwashed LNG ad, I think of that moment when PSE chose to invest in militarized force over hearing and respecting the wishes of the community they are supposed to be serving. They could have put all of our lives at risk. And I'm grateful to be standing here in front of you today. I truly hope the supplemental environmental impact statement is redone properly before denying the LNG permit. Our community has already experienced enough trauma over the last year because of this project. Thank you.

Steve: Thank you. So, the next one is Sarai Salgado.

[06:00:03] I don't know if I'm saying this – Sardi, Sarah, I can't read the writing. I'm sorry.

Sarai: Good evening. My name is Sarai. I work in Tacoma, and I wanted to come this evening to represent some of the people in my generation that believe in science and want to see our government bodies use the best available science, when making decisions. I am here to applaud the work of the draft Environmental Impact Statement that concludes, and I quote, "The use of LNG produced by the proposed action, instead of petroleum based fuels for marine vessels, trucks, and peak shaving is predicted and results in overall decrease in GHG emissions the Puget Sound region and that beneficial impact."

The findings of SEIS conclude that we will reduce greenhouse gases by 13.5%. As someone who believes in climate change, we all have a responsibility to do what we can now, not later, to save our planet.

[06:01:00] Saying not to LNG facility is saying not to doing our part to reduce greenhouse gas emissions. Saying no to LNG is saying not to reducing sulfur oxides. Saying not to reducing particulate matter is saying not to reducing nitrogen oxides. And saying not to LNG is saying yes to more air pollution. We have a real choice to make. While LNG is not perfect, it does represent a significant step in the right direction. And it sure as heck beats the alternative. Let's not let emotion, unrealistic expectations, or politics get in the way of following science and data. As former Vice President Al Gore stated, "We have a global emergency. We don't have one more day to spare without consequences."

Approve the air permit for LNG facility and let's celebrate TOTE's environmental commitment to making our marine time industry less polluting. Thank you.

Steve: Thank you. Next up is Twylia Westling? Twylia Westling?

[06:02:00] I can tell you the next 10 on the list here. Jennifer Williams, Kelly Scott, Beverly Christie, Janine Terrdao, Steve Way, Michael Foster, Jessica Lee, Bill Crawford, Grace Green, and Ben Nelson. So, Jennifer Williams? Kelly Scott? Did we already have Kelly Scott talk?

1953-1 23. General Support

From: Sarai Salgado
To: Public Comment
Subject: Clean Air Public Comments
Date: Wednesday, November 21, 2018 2:54:41 PM
Attachments: Sarai"s Thanksgiving 11-20-18 LNG.docx

Hello,

Attached please find my letter/public comment. Please let me know if there is anything else you require.

Thank you,
Sarai Salgado-Miranda
(253) 394-1162

November 20, 2018

To Whom It May Concern:

I wanted to write to you today to represent some people of my generation that believe in science and want to see our governmental bodies use the best available science when making decisions.

I write to you to applaud the work of the Draft Environmental Impact Statement that concludes, and I quote:

> *"The use of LNG produced by the proposed action, instead of petroleum-based fuels for marine vessels, trucks and peak shaving is predicted to result in an overall decrease in GHG Emissions in the Puget Sound Region a net beneficial impact."*

The findings of the SEIS conclude that we will reduce greenhouse gases by 13.5%. As someone who believes in Climate Change, we all have a responsibility to do what we can now, not later, to save our planet. Saying no to this LNG Facility is saying no to doing our part to reduce greenhouse gas emissions. Saying no to LNG, is saying no to reducing Sulphur oxides. Saying no to reducing particulate matter. It is saying no to reducing nitrogen oxides and saying no to LNG is saying yes to more air pollution.

Like it or not, we have a real choice to make. Are we going to move forward or go backwards? While LNG is not perfect, it does represent a significant step in the right direction and it beats the alternative.

Let's not let emotion, unrealistic expectations or politics get in the way of following the science and the data. As former Vice President Al Gore has stated, "we have a global emergency". We don't have one more day to spare without consequences. Approve the air permit for the LNG Facility and let's celebrate TOTE's environmental commitment to making our maritime industry less polluting by a long shot!

Sincerely,

Sarai Salgado

1440-1 22. General Opposition

From: Sherry Salomon
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 6:00:30 PM

Name: Sherry Salomon
Email: sherrysalomon@comcast.net
Address: 2393 SW Park Place #204 - 204
Portland, Oregon 97205

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Our ability to help the environment is slipping away. Act now!

0619-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the ~~tenth~~ percent of methane that would leak from the pipelines used to bring gas to the Kalama methanol refinery. Studies have shown pipes in the US leak between 1-4%. A low leak rate would be cleaner while a high leak rate would mean a large amount of methane being released into the atmosphere. Methane is 86 times as powerful a greenhouse gas compared to carbon dioxide in the first 20 years after release, we are already seeing the impacts of global warming such as the smoke filled summer in Washington state, please reserch the leak rate from the pipeline Kalama would use.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	Email: bill.sampson.2@gmail.com
Address: 6555 51st Ave NE Seattle WA 98115	Phone: (206)384-9682

0620-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

~~For~~ I am concerned about the impact the Kalama methanol refinery would have on endangered Salmon and orca species. The refinery would take 5 million gallons of water a day out of the Columbia river. This will harm water flow and quality threatening already endangered Salmon who swim along the Columbia River and to the Sea. The orcas rely on Salmon as a food source, the Orcas are crucial to Washington States economy and culture. I have seen orcas in the wild and they are wonderful and highly intelligent species

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	Email: bill.sampson.26@gmail.com
Address: 6555 51st Ave NE Seattle WA 98115	Phone: (206) 384-9682

0621-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about the risk of an explosion or spill at the Tacoma LNG facility. The gas needs to be kept at -260 degrees fahrenheit in order to ship it. If there a spill this could cause a large explosion or spill, please study the impacts of a worst case scenario accident on the community and marine life. The Northwest detention center is nearby and there is no plan for how to insure the safety of community members being detained at the detention center, the plan is to shelter in place which is not a plan.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	Email: bill.sampson.26@gmail.com
Address:	Phone: (206) 384-9682

0631-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about PSE ~~hearing~~ acting in the communities best interest They have built the LNG facility without the proper permits. Many people in tacoma are against the facility and it is on puyallup tribal land, PSE is an important and valuable provider of energy in the region, However this LNG facility has no benefit to local communities from an energy usage standpoint, Please make sure PSE will follow laws and regulations pertaining to operation of the tacoma LNG facility

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	Email: billrsampson.24@gmail.com
Address: 6555 51st Ave NE Seattle WA 98115	Phone: (206) 384-9682

Steve: Thank you. Bill Sampson?

Bill: Hi. Thank you for letting me speak today. My name is Bill Sampson, and I live in Seattle. I volunteer with the Sierra Club. And you've heard a lot about why natural gas is bad or why fracked gas is bad and a lot of the impacts of this project.

[05:03:00] So, I want to talk about why I'm here and why the people who are in red are here. My shirt says, "Beyond coal exports," because the first hearing I went to like this was about the scoping hearing for the draft environmental impact statement of the Cherry Point coal terminal up in Bellingham. And I've been to several, many hearings like this, since then. And I think there's a lot of common themes between all of these fossil fuel projects. The for profit proponents, they mostly care about profits. Whereas the people in the room here wearing red, they care about the health and safety and livability – the care about the people in the communities.

And they want everyone to have a safe, livable, breathable climate. In the climate movement, we have a few sayings like coal, oil, gas, none shall pass. And so, to me, that means that we want a safe, livable, breathable climate.

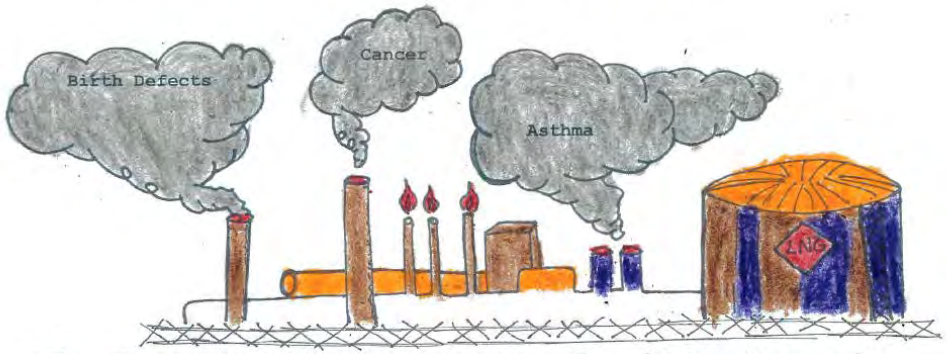
[05:04:02] We want renewable energy and not fossil fuels because all of the fossil fuel, it's bad energy. It's dirty energy. It's really bad. And another saying we have is people over pipelines. And so, that really applies to these fracked gas projects. We want to prioritize the health, again, of people instead of pipelines and profits. Thank you.

1294-1 22. General Opposition

RECEIVED
NOV 18 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

LNG Is Bad For Our Health!!!



The Tacoma LNG Air Permit Should Be Denied.
Please Value People Over Corporate Profits!

Name Bill Sampson Age 28

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2155-1 22. General Opposition

I am concerned about PSE ~~having~~ acting in the communities best interest They have built the LNG facility without the proper permits, Many people in Tacoma are against the facility and it is on Puyallup tribal land, PSE is an important and valuable provider of energy in the region, Howe this LNG facility has no benefit to local communities from an energy usage standpoint, Please make sure PSE will follow laws and regulations pertaining to operation of the Tacoma LNG facility

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	**Email:** bill.sampson.26@gmail.com
Address: 6555 51st Ave NE Seattle WA 98115	**Phone:** (206) 384-9682

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2165-1 3. Outside of SEIS Scope

I am concerned about the risk of an explosion or spill at the Tacoma LNG facility. The gas needs to be kept at -260 degrees fahrenheit in order to ship it. If there a spill this could cause a large explosion or spill, please study the impacts of a worst case scenario accident on the community and marine life. The Northwest detention center is nearby and there is no plan for how to insure the safety of community members being detained at the detention center, the plan is to shelter in place which is not a plan.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	**Email:** bill.sampson.26@gmail.com
Address:	**Phone:** (206) 384-9682

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2166-1 3. Outside of SEIS Scope

I am concerned about the impact the kalama methanol refinery would have on endangered salmon and orca species. The refinery would take 5 million gallons of water a day out of the Columbia river. This will harm water flow and quality threatning already endangered salmon who swim along the Columbia River and to the sea. The orcas rely on salmon as a food source. The orcas are crucial to washington states economy and culture. I have seen orcas in the wild and they are wonderful and highly intelligent species

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	Email: bill.sampson.260@mail.com
Address: 6555 51st Ave NE Seattle WA 98115	Phone: (206) 384-7682

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2167-1 3. Outside of SEIS Scope

I am concerned about the ~~tenth~~ percent of methane that would leak from the pipelines used to bring gas to the Kalama methanol refinery. Studies have shown pipes in the US leak between 1-6%. A low leak rate would be cleaner while a high leak rate would mean a large amount of methane being released into the atmosphere. Methane is 84 times as powerful a greenhouse gas compared to carbon dioxide in the first 20 years after release. We are already seeing the impacts of global warming such as the smoke filled summer in Washington State. Please research the leak rate from the pipeline Kalama would use.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Bill Sampson	**Email:** bill.sampson.26@gmail.com
Address: 6555 51st Ave NE Seattle WA 98115	**Phone:** (206) 384-9682

1601-1 22. General Opposition

From: Randal Samstag
To: Public Comment
Subject: No LNG for PSE
Date: Tuesday, November 20, 2018 4:48:38 PM

Please include my voice as against granting a permit for PSE to build their LNG terminal is Tacoma.

Sincerely,

Randal W. Samstag
Civil and Sanitary Engineer
Email: rsamstag@rsamstag.com
Web: http://rsamstag.com/
Phone:+1 (206) 851-0094
PO Box 10129
Bainbridge Island, WA 98110 US

0346-1 22. General Opposition
0346-2 14. LCA Inputs and Assumptions - Leakage/Slippage
0346-3 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Hillary Sanders

Address or email 325 233RD St SW, Bothell WA 98021

I have repeatedly heard LNG (Liquified Natural Gas) referred to as a "bridge fuel." I don't know where this term came from, but in my mind, any energy source which involves a 3% leakage rate of methane, as well as other concerns to air quality including arsenic, cadmium and VOCs (Volatile Organic Compounds) is NOT a "bridge", but a barrier. It is a barrier to our communities remaining healthy and prosperous. It is a barrier to correcting years of harm done by the fossil fuel industry. LNG is a barrier to progress. In these desperate times, we MUST do better. We cannot afford to settle. For the sake of clean air, please vote NO on this final permit. Let's stop living in the past. Defend the future. Thank you. Hillary 10/30/18

0447-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Hillary Sanders

Address or email 325 233rd St SW Bothell WA 98021

The DSEIS needs to be redone — it does not accurately capture outcomes of this project and is based on unrealistic timelines that do not take into account the rapidly approaching deadline for humanity to avoid climate disaster.

Methane is a significantly more potent greenhouse gas than CO_2, especially in the short term. The DSEIS is based on the 100 year GWP of methane. The recent IPCC report released indicates we must change our energy fuel mix in the next 12 years or face dire consequences in just 22 years. The SEIS should use 20 year model for methane leakage. A 2018 report found 85% of active wells are directly venting methane DAILY and that those →

leakages have been historically underreported.

2/3 of all "natural" gas in the U.S. is fracked. LNG will not arrive in Washington carbon neutral. When methane leaks directly into the atmosphere, it is 87 TIMES MORE POWERFUL at trapping heat than carbon dioxide when averaged over 20 years.

The DEIS needs to rely on accurate science and must be reissued with ample time for public comment. We cannot make educated decisions on LNG with an SEIS that doesn't reflect the reality of the crisis we are in.

I want to trust the process. I want it to be transparent. I want to see an SEIS that incorporates recommendations from the IPCC report. I want the Puyallup Tribe to be properly consulted as is required by law. Until these things are done, I cannot see how the process of LNG can move forward. It's an environmental justice issue. Its time to listen to science, not special interests and money.

Please do the smart thing — the right thing.

Thank you.

Hillary 10/30/18

0447-1 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value

1143-2 22. General Opposition
1143-2 5. Regulatory Framework

Steve: Thank you. Next up is Hillary Sanders.

Hillary: Good evening. Thank you for hearing us today. My name is Hillary Sanders. I am a resident of Bothell. I wake up every morning and step out onto my back porch, and I take a deep breath.

[03:33:00] And I do not have to worry about whether or not that air is clean. And that is a privilege that I hold. I have never had to worry about air quality affecting my health, until the last few wildfire seasons. And I think a lot of us, in this room, could say the same. But for many people in our state, they do not have that privilege. And it is not because of anything that they did or did not do. It is because government entities and large corporations, oil companies, coal companies, energy companies like PSE, are deciding what is best for the people. I think it is an injustice that this LNG project has been allowed to go forward without a vital permit and without the consent of those who will be most impacted by air pollution.

The Puyallup Tribe was not properly consulted. The residents of Tacoma were not properly consulted. This is not how Puget Sound Energy should do its business. They have a responsibility to residents, as do you, to ensure that we have clean air to breathe.

[03:34:00] If this facility is approved, the community will be exposed to dangerous, volatile organic compounds that have been linked to birth defects, cancers, and nervous system problems. Furthermore, the draft SEIS insufficiently captures outcomes of this project and is based on unrealistic timelines that do not take into account the rapidly approaching deadline for us to avoid climate disaster. What I am asking you to do today is to not turn your back on the people in this room, the people who have been talking here today for hours. Don’t turn your back on them the way that PSE has. The people have spoken.

This project is not right for Tacoma, and it is not right for Washington. We can do better than LNG. Please do the right thing for the people of Tacoma. We need an accurate EIS. We need a cleaner solution than LNG. Please defend the future. Thank you.

1676-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 12:36:42 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

The LNG facility will emit toxins such as benzene, toluene and xylene - causing cancer, asthma, birth defects & other health problems for people living and working near the facility. People detained inside the NW Immigration Detention Center & people living on the Puyallup Reservation will be impacted first and worst by this toxic air pollution.

Everyone from health professionals to educators and scientists have expressed their concern about the damage this facility will inflict on people and the environment.

From my understanding, it is the role of the PSCAA to defend those communities most impacted by air pollution, not protect the profits of big foreign energy companies like PSE.

Please do the right thing and deny the clean air permit for LNG.

Sincerely,

Hillary Sanders
hillary_sanders@yahoo.com
98021

1687-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 12:30:23 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The recent Intergovernmental Panel on Climate Change report states that we have only 12 years left to radically transform our energy system if we are to have a stable climate future - and that means keeping all new fossil fuels in the ground.

The Clean Air Agency's analysis of PSE's LNG facility is based on 100-year, not 20-year, global warming potential (GWP) values. We should be using the 20-year numbers, as that is the time frame where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the bunker fuel it's supposed to replace.

This is not acceptable.

Please be heroes to our future generations. Issue an accurate DSEIS and allow for a new comment period so the community has the opportunity to review.

Sincerely,

Hillary Sanders
hillary_sanders@yahoo.com
98021

1456-1 22. General Opposition

From:	Gay and David Santerre
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Tuesday, October 30, 2018 5:05:42 PM

Name: Gay and David Santerre
Email: santerre@tx3.net
Address: 13118 288th Ave Ct. East -
Buckley, Washington 98321

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We have just recently been informed by the world's top climate scientists that unless we radically change our energy consumption, we have maybe only 12 years before severe climate change will reek havoc on human civilization and our planet. This LNG Project flies directly in the face of this news. Is PSE blind, is it deaf to this news?!!!

1696-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 11:54:21 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Leave our waters alone.
Our families have luved here for many generations.
The pollution has affected the water life. Micro biology, marine life, now humans!
Find Alternative ways to make a buck.
Not at our expense

Sincerely,

ELIzabeth Satiacum
elizabethsatiacum@gmail.com
98467

1750-1 10. LCA Calculations

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 11:47:50 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.

Sincerely,

Jamie Sayegh
jasca10@yahoo.com
98225

1458-1 22. General Opposition

From: Barbara Scharff
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 10:53:49 AM

Name: Barbara Scharff
Email: buscharff@msn.com
Address: 3025 Ne Brazee St -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Decision-makers:
We are only beginning to understand the scientific consequences of thawing perma-frost which will add unprecedented amounts of carbon to the already overloaded atmosphere. We MUST take this into consideration before aiding and encouraging more fracking and release of other fossil fuels.

Seriously, don't you have children and grandchildren? What kind of horrific planetary crises and massive storms and droughts will they be contending with due to our generation's profligacy?

Thank you and please consider,
Barbara Scharff

1865-1 22. General Opposition

Name

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

This kind of short-sighted, destructive project should not go forward. We need to transition out of all fossil fuels, not invest in infrastructure that locks us in. The destruction of the immediate neighborhood should also bar this project. Please represent your constituents (Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Jenifer Schramm Email: shadydogs@msn.com

Address: 2724 NW Thurman St, #2, Portland OR 97210

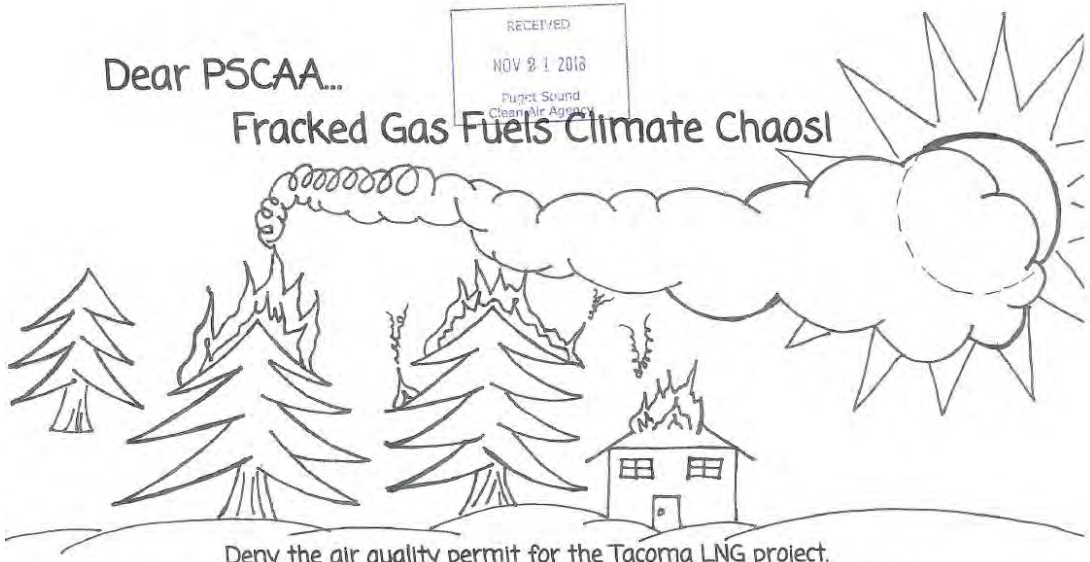
By completing this comment card you agree to receive updates about the project.

1256-1 22. General Opposition

RECEIVED
NOV 2 1 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage, "natural" gas is potentially as bad for the climate as coal.

Name [redacted] Ollie Age 6

1471 20th St
Seattle, WA 98122

Alexis Schurman,
Plant for the Planet Climate kid
Zero Hour member
Bike rider
Future mom & veterinarian.

Supported by her parents
Grace Stahre
Eric Schurman



2185-1 22. General Opposition

From: jmichscott@everyactioncustom.com on behalf of James-Michael Scott
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 3:13:20 PM

Dear Responsible Official,

The proposed Puget Sound Energy and Tote Marine LNG project is another step toward creating increased climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels. This is totally reckless and should be avoided.

Fracked gas is not a lesser evil. Methane's impact on the climate continues to evolve and deepen over time.

Please, please STOP this danger in its tracks!

Sincerely,
James-Michael Scott
Nashville, TN 37214
jmichscott@aol.com

1170-1 23. General Support

Steve: Kelly Scott?

Kelly: Good evening. Thank you for the opportunity to provide a public comment for the draft SEIS. My name is Kelly Scott. I live four blocks away from this theater. I also work for TOTE Services as the LNG conversion port engineer. This means that I am responsible for most aspects of the vessel's conversion to run on LNG. TOTE will be submitting formal, written, technical comments, but I thought it was important to also attend this public meeting. The conversion of TOTE's vessels to run on liquified natural gas as a maritime fuel puts TOTE in the company of a few key environmental leaders in the shipping world.

[04:49:07] As noted by various studies and reviews, the use of LNG results in a reduction of various air emissions, including NOx, SOx, and particular matter as well as reduction of greenhouse gases. TOTE's efforts to improve our environmental footprint are in keeping with the International Maritime Organization's regulations addressed to NOx and greenhouse gases. The use of LNG will virtually eliminate SOx surpassing the IMO rules regarding sulfur emissions to be limited to 0.5%.

In addition, the use of LNG as a fuel, currently, the only commercial available option that put the maritime community on the path of meeting the recently set goals of reducing greenhouse gas emissions by 50% by 2050.

[04:50:05] We strive to be leaders in our industry seeking new and innovative ways to reduce our environmental impact while offering the best in class service to our customers and the communities we serve. The use of LNG as a maritime fuel does both of these things while also laying the foundation for the shift from diesel to natural gas, as a fuel of choice, for the maritime sector. A fuel that, as you noted in your report, has the ability to reduce maritime emissions by at least 13%. The maritime sector will continue to evolve and find new fuel options. LNG is the most environmentally friendly fuel available today. Thank you.

Steve: Thank you. Before I call up the next group, the next group of five, it's Saiyare Refaei, Bill Sampson, Bradley Thompson, Linda Fortune, and Stephanie Hillman.

Carole: Thank you. Andrea Scott-Murray?

Andrea: Hi. I'm a lifetime resident of Washington State. I'm a PSE rate payer. And I am also a person who has suffered with asthma my whole, entire life.

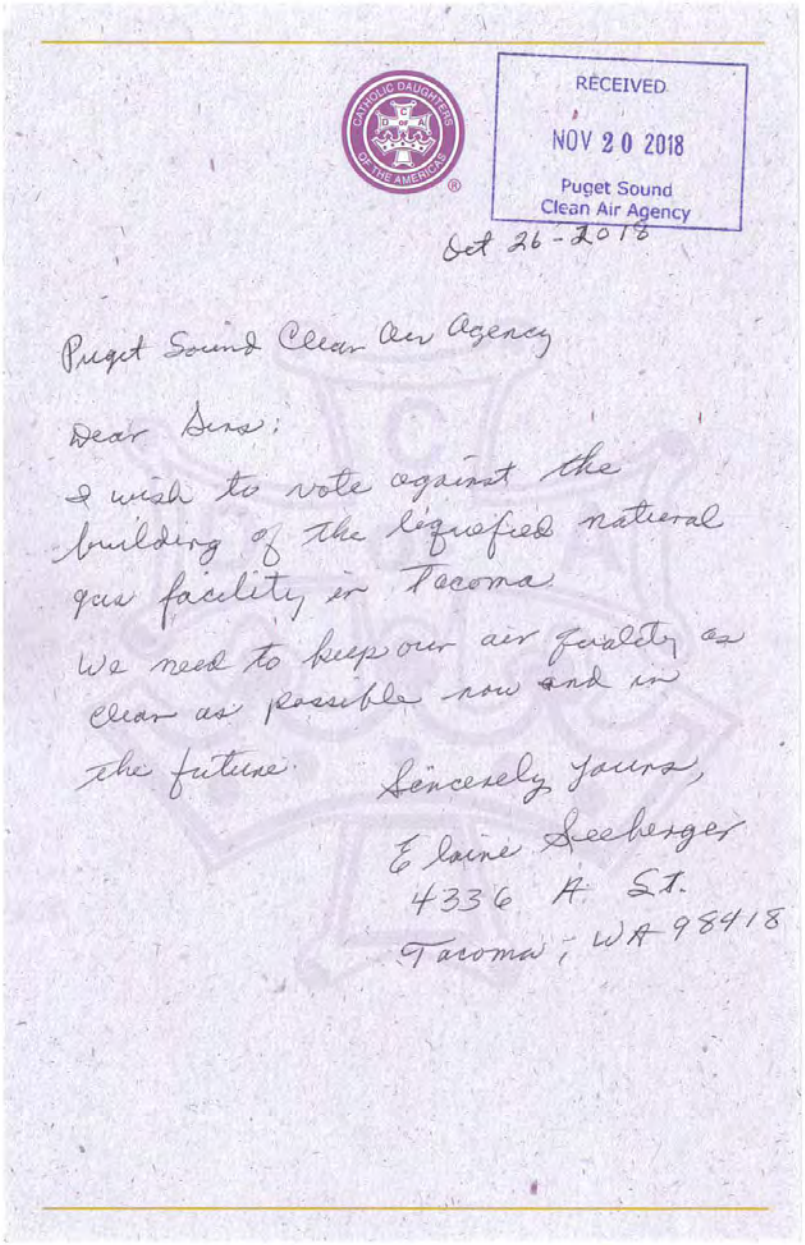
[00:59:00] I'm also qualified as a middle school science teacher. So, there are a lot of threads in my life that come to this point where I'm standing before you. I'm hearing a lot of words. There are a lot of numbers. And all of that is very important. I want to say one other thing though. There's the experience of standing in a tide flat. It can be argued that that's a big, empty space that there's nothing useful or valuable happening there. As a person who has kayaked, as a person who has sailed, as a person who has spent many hours on the beach, I will tell you it is a very valuable place.

There is a great deal of wildlife, a great deal of energy, and a great deal of chemical processes that are happening there.

[01:00:00] In my mind, even if you could agree, and I can't, if you could agree that LNG is a way forward, in terms of transitions, if you could agree to that, I do not, in any sense, think that putting a plant like this is appropriate on a tide flat. I think that is very bad siting. I'm really shocked. And my brother lives here in Tacoma. He has an old house. For him to paint his house because it has lead paint, he has to go get a $200.00 permit with the city of Tacoma. And now, I am wondering why PSE is coming before us with an incomplete report with procedures that are not being followed in terms of permitting without consulting with the Puyallup Tribe.

[01:01:10] There are rules in place. Those rules need to be followed. And, in the end, I ask you, Clean Air Agency, to ignore these economic arguments that are being put forward to you and look to your paramount issue, which is to provide us all with clean air. My life depends on that.

2501-1 22. General Opposition



RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Oct 26-2018

Puget Sound Clean Air Agency

Dear Sirs:

I wish to vote against the building of the liquefied natural gas facility in Tacoma.

We need to keep our air quality as clear as possible now and in the future.

Sincerely Yours,

Elaine Seeberger
4336 A St.
Tacoma, WA 98418

1715-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 3:49:07 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Kirsten Segelquust
kiselynne@yahoo.com

2214-1 22. General Opposition

From: tomokos1120@everyactioncustom.com on behalf of Tomoko Sekiguchi
To: Public Comment
Subject: Climate change requires fossil fuels to stay in the ground Tacoma LNG SEIS Project Comment
Date: Wednesday, October 24, 2018 1:17:01 PM

Dear Responsible Official,

The only responsible thing to do is keep all fossil fuels in the ground if we hope to keep global temperatures below a 1.5°C rise above pre industrial levels. And anything above that will cause mass extinction. Please deny the permit for the Tacoma LNG project.

Sincerely,
Tomoko Sekiguchi
Eugene, OR 97403
tomokos1120@gmail.com

2179-1 3. Outside of SEIS Scope

From: lionspride780@everyactioncustom.com on behalf of Todd Selle
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, November 4, 2018 11:54:55 AM

Dear Responsible Official,

There are a number of arguments being made intended to deter Puget Sound Energy and Tote Marine from constructing a very large fracking tank near Tacoma, Washington, that have to do with the impact on nearby communities. Here, I'd like to provide another reason this project should not continue with an emphasis on the broader environment.

To express it in the simplest of terms, fracking is a bad idea. Period. It contributes to global warming - a threat with the potential to cause more harm than ISIS, MS-13, the worst-case scenario surrounding Iran, drug abuse, and the the collective impact of all plagues combined - due to the release of potent methane gases. There is evidence if not settled proof, that fracking may induce earthquakes and poison drinking water in some communities. Expanding the use of fracking is basically consenting to trading public safety and potentially the long-term future of life on Earth for electricity and profits. I contend this is not a good deal.

I'm doubtful that my comment nor 10,000 others is going to inspire anyone to consider these thoughts, let alone change a single mind. But in hopes that my doubts are unfounded, I submit this for your consideration.

Sincerely,
Todd Selle
Las Cruces, NM 88011
lionspride780@aol.com

1967-1 23. General Support

From: jshanstrom@wamail.net
To: Public Comment
Subject: LNG facility planned for Tacoma
Date: Monday, October 8, 2018 4:43:54 PM

I support PSE's planned LNG facility because it will help TOTE convert from dirty bunker fuel to a much cleaner fuel source (they've already set up electric shore power to minimize burning bunker fuel while in port), I'm confident that PSE is using an established technology which has been proven to be safe, and because the facility will provide a relatively clean source of back up power for Tacoma. John Shanstrom, Tacoma 98407

1453-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: BEPPIE SHAPIRO
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 8:18:50 PM

Name: BEPPIE SHAPIRO
Email: beppie@hawaii.edu
Address: 3860 SE Woodward ST Apt 2 -
Portland, Oregon 97202

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

As a resident of northern Oregon, and as a citizen of a warming world, I am concerned that the draft EIS submitted is based on very flawed reasoning. The analysis is seriously flawed and unacceptable. The
Air Agency must get better data and analysis before they decide on the air permit for the facility.
The draft SEIS uses an outdated methane global warming potential (GWP) value - GWP is a measure of
potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1.
Methane has a much larger GWP value, especially over the short term. The draft SEIS uses the United
Nations' 2007 value of 25 for the 100-year number (i.e. the methane average GWP over 100 years), whereas they should be using the 2016 value of 32. This single modification in SEIS GHG model makes the LNG plant dirtier from a greenhouse gas emissions perspective than if the LNG plant were not built.

Methane is significantly more potent in the near-term, yet the SEIS analysis only looks at the long
term impact . The draft SEIS analysis is based on the 100-year GWP of methane. The IPCC report released a scary report on October 8th, indicating that we must change our energy fuel mix in the next 12 years or face extremely dire consequences in 22 years. Therefore, the SEIS should use the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 50% dirtier than the current capability.

Please reject this draft EIS and demand a more meaningful and accurate one. The lives of our children, not to speak of our grandchildren, and of the animals and plants around us, deserve better consideration.

0364-1 22. General Opposition
0364-2 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Dinne Shaughnessy

Address or email dshau@aol.com

I urge PSCAA not to issue the permit for the NLG. within the Three mile blast zone of the LNG there are schools, homes, ICE detention center with no evacuation plans) To name some of what would be destroyed. The land the LNG is located on is also earthquake prone. Fracked gas (main source) contributes to global warming, contaminates water and can cause earthquakes.

Renewable energy is the future and needs to be invested in rather than fossil fuels.

1591-1 3. Outside of SEIS Scope

From: Dshau1
To: Public Comment
Subject: LNG Tacoma
Date: Tuesday, October 16, 2018 1:19:26 PM

I urge Puget Sound Clean Air agency to not issue the permit for the Liquefied natural gas facility in the Tacoma tide flats. The explosive nature of natural gas is a concern. There have been many natural gas explosions including the Canadian pipeline explosion in early October of this year. Within the three mile blast zone of the LNG proposed plant in Tacoma there are schools, homes, the ICE detention center (with no evacuation plans) to name some of what would be completely destroyed in the event of an explosion.

The main source of gas would be from fracked gas which contributes to global warming, contaminates the water and can cause earth quakes.

Global warming is on the increase as evidenced by the increased hurricanes , , droughts, record breaking temperatures, increased floods, to name a few of the destructive results from the raise in temperature.

In addition building on this site in the port of Tacoma is a violation of the Puyallup Tribe's Medicine Creek Treaty of 1854.

Diane Shaughnessy

7308 N Skyview PL A208

Tacoma, WA 98406

1698-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 10:01:17 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Investment in renewable, non fossil fuel energy is overdue.

Sincerely,

Diane Shaughnessy
dshau1@aol.com
98406

1732-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Sunday, November 18, 2018 5:30:54 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Diane Shaughnessy
dshau1@aol.com
98406

1654-1 3. Outside of SEIS Scope

From: Betty Sue Sherrod
To: Public Comment
Subject: Puget Sound Energy and Fracked Gas in Tacoma
Date: Friday, November 16, 2018 9:11:16 AM

Dear Puget Sound Clean Air Agency,

I am writing to oppose the building of the Tacoma Liquefied Natural Gas (LNG) facility.

Now retired, in 1996 to 1999 I lived and worked as a pastor for two small churches in rural western Pennsylvania. I believe it was toward the end of my service, that I began to hear stories of brown water coming from people's faucets after fracking began in the area. Their wells were being destroyed. In recent years, increased earthquake activity has been linked to areas where fracking occurred. Fracking has been connected to real damage in real people's lives. I must speak to oppose it.

I believe the scientists when they tell us that we are living very close to the edge of the full disaster of global warming and climate change. There are many factors that have contributed to the Camp and Woolsey fires in California - where I also served; but global warming and our use of petroleum, surely bear a substantial portion of the responsibility for the destruction, the 60+ deaths, and the 600+ missing persons. We need to move away from the use of petroleum, not towards it! This is not a time to allow others to make more profit on the degradation of the earth. How can we create profit on something so deadly? I must speak to oppose it.

Thank you for receiving comments.
I pray your deliberations will dig deeper than these fossil fuel deposits and look further into the future of our children, our grandchildren, and the earth itself.
Rev. Betty Sue Sherrod (retired)

--
"Anyone who thinks that they are too small to make a difference, has never tried to fall asleep with a mosquito."

Christine Todd Whitman, quoted by Preet Bharara on "Stay Tuned with Preet"

0355-1 22. General Opposition
0355-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0355-3 13. LCA Inputs and Assumptions - Natural Gas Source

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

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Note: All comments received during the comment period become part of the public record.

Name Nancy Shumeall

Address or email nshumeall@gmail.com

This LNG facility is not a bridge – it will be used for 40 years – and by then our climate will be in catastrophic times. The fracked gas will come from the US, BC, and Alberta, and the SEIS must be rewritten to include current (not 2007) data about methane leaks from ~~extraction~~ point, through transport, to the Tacoma LNG AND the effects of 93% of it being burned as fuel.

so:
- use current data
- include all 40 years
- include upstream and downstream leaks and explosions.

0454-2 22. General Opposition
0454-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

The SEIS is using outdated methane emissions data – eleven years old – when much more accurate data is available. This is not good science or engineering. The SEIS must be redone ~~and~~ with current scientific info, and a new public comment period set.

Please include this in the final supplemental environmental impact statement.

Name: Nancy Shimeall	Phone: 360-708-4014
Address: 6634 154th Ave NE zip 98052	Email: nshimeall@gmail.com

(PSE Ratepayer)

Carole: Thank you, Mr. Voget. Nancy Shimeall?

Nancy: Hi, I'm Nancy Shimeall. And I'm a PSE rate payer. But as such, I object to this project. I am against approval.

[00:10:00] For one thing, although the first two speakers mentioned about the benefits of using bunker fuel, what you need to take into account is that it will increase the use and extraction of fracked gas. And we know that you need to include both the upstream and the downstream pollution that occurs when it's extracted, transported, and processed, as well as burned later. So, please include that in your consideration. But I also want to talk about from the heart. It deeply concerns me that the Puyallup tribe is being disregarded, in terms of the approval of this facility and in worrying about what's happening to their treaty land.

And also, I know that, as your job as the Clean Air Agency, that it's your job to be stewards of our air and our resources.

[00:11:00] And I honestly don't know how we can still be talking about a facility like this, when we know, from the recent IPCC report that we only have 12 years to do anything about runaway climate change and the impacts. So, I ask you to think about all of that as well. And I implore you to please don't approve this. Thank you.

1194-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1194-2 5. Regulatory Framework

1778-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 3:26:23 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Right now we are breathing the smoke that comes from California's wildfires. The fire season is all year long now; we are paying the price here, and in 10 years, according the IPCC report, we will not be able to stop catastrophic climate change. PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Nancy Shimeall
nshimeall@gmail.com

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2073-1 3. Outside of SEIS Scope

I am deeply concerned about the toxic chemicals that are released during fracting, and transporting, and refining fracked gas. Asthma, cardiovascular disease, birth defects, and neurological harm must all be considered during the DEIS/permitting process.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimegall	Email: nshimeall@gmail.com
Address: 6634 159th Ave NE Redmond WA 98052	Phone: 360-708-4014

2081-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am concerned that these fossil fuel projects will increase the demand for fracking. The SEIS must include the environmental impact of continued fracking and the increase in fracking.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall	Email: nshimeall@gmail.com
Address: 16634 [illegible] 59th Ave NE Lake Stevens 98258	Phone: 360-708-4014

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

If built, both the Kalama refinery and the Tacoma LNG refinery would require a massive new pipeline, spanning our state or Canada or several other states. The SEIS must include the fact that methane leaks and use up to date projections (4% - 11% leakage) to study the impacts on our environment.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall	Email: nshimeall@gmail.com
Address: 6634 15th Ave NE Seattle, WA 98115	Phone: 360-708-4014

2083-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am deeply worried about the fact that methane is 86 times more powerful of a pollutant over a 20 year period than carbon. Permitting agencies must use the most up-to date potential for methane when studying the impact of any project!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall	**Email:** nshimeall@gmail.com
Address: 6634 15 9th Ave NE	**Phone:** 360 708 4014

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2084-1 3. Outside of SEIS Scope

I am concerned about the excessive use of water during the fracking process, and fresh water is becoming more scarce. Water should be provided for human consumption, not fracking. Please look into the quantity of water diverted to the projects.

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall | Email: nshimeall@gmail.com
Address: 6634 159th Ave NE | Phone: 360 708 4014

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2085-1 3. Outside of SEIS Scope

I am very worried about the claim that PSE and NWRW will supposedly not operate at full capacity. There is no way that this is a guarantee, and before permitting occurs the projects must study the impacts of running at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall	Email: NShimeall@gmail.com
Address: 6634 159th AVE CVE Battle Ground	Phone: 360 708 4014

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2086-1 3. Outside of SEIS Scope

I am concerned about the health impacts of the refinery within close proximity of both the extraction site and the refinery site. Permitting must include the study of health impacts of areas near these sites.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Nancy Shimeall	Email: nshimeall@gmail.com
Address: 6634 159th Ave NE Redmond 98052	Phone: 360 708 4014

0459-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a young adult with great concerns for this LNG plant. I look forward to a future that does not rely on harmful fracked gas that puts our communities and children at risk. You have a moral responsibility to redo the SEIS to accurately reflect the emissions it will cause. Consider the very real harm this facility will do in Tacoma and our world before moving forward with this toxic project.

Please include this in the final supplemental environmental impact statement.

Name: Rachel Shinaburger	Phone: 815-905-1685
Address: [illegible] 98122	Email: rachel@earthministry.org

Rachel: Reverend Ruud could no longer be here. He had another obligation, but he asked me to speak on his behalf.

Steve: Did you sign in yourself coming in?
Rachel: I did not.

Steve: Go ahead.

Rachel: My name is Rachel Shinaberuger. And as a person of faith, I value our planet as a gift from the creator. I believe we are charged to take that gift and care for it as best we can. This includes caring for air, water, and land. In caring for our environment, we ensure that we are also caring for its people. The choice of adding more fossil fuel pollution to our atmosphere has very real consequences. Even this week, due to global warming temperatures, Super Typhoon Yutu ravaged through the Pacific breaking records as the strongest storm to touch US soil, since 1935.

[04:26:05] As someone who has lived in Central and South America, I've seen first hand the devastating effects that this change has had on both the land and the communities there. I desire climate justice and that means caring for our neighbors globally and locally. I'm asking you to listen to the voices of those most vulnerable to pollution and climate change. Especially listen to the Puyallup Tribe as they request you respect their lands and their water. The LNG plant is clearly an immoral and irresponsible choice for our future. The SEIS is in need of further review and revision and should be open to further public comment.

We all have a moral obligation to care for our home and for each other. The people of Tacoma desire a better, brighter, cleaner environment for our community. Please protect us from the harmful LNG plant, while we work together to build a better future for us all. Thank you.

1727-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 21, 2018 12:38:19 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Honor the treaties with the Puyallup Nation.

Sincerely,

Nora Shinya
nora.n.shinya@gmail.com
97116

1446-1 3. Outside of SEIS Scope
1446-2 5. Regulatory Framework
1446-3 22. General Opposition

From: Margaret Shiple
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 6, 2018 2:45:19 AM

Name: Margaret Shiple
Email: maggieshiple@gmail.com
Address: 3505 NE 80th APT 2 -
Portland, Oregon 97213

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Further progression of the LNG Refinery would be incredibly irresponsible both ethically and environmentally.
First and foremost, the Puyallup people are a sovereign governmental body and they have the right to decide what takes place on their land. The production of this refinery would be an act of violence to their families, resources, future, culture, etc. The native people of North America should never have suffered as they already have; how can we continue to disrespect their livelihood and their laws?
The LNG refinery will output dangerous levels of methane into our atmosphere during this pivotal and urgent time for our climate in crisis. This methane, and other volatile organic compounds, will be released into the atmosphere and most-affecting vulnerable, already oppressed, native communities. The delicate properties of LNG, in addition to all of the methane, makes for a very dangerous risk of explosion. The blast zone from this explosion is expected to be at least 3 miles. This would fatally-engulf a huge community if a fire were to happen! It also puts anyone working within the facility in grave danger - the extent of which is not even known because of lack of permits. Fires and explosions on other LNG refineries and oil trucks are not uncommon and have claimed hundreds of lives already.
Fracking uses a huge amount of water and desecrates otherwise beautiful, fertile land that could be utilized for things like sustainable crops, fisheries, oxygenation, etc.
Additionally, refineries often bring in thousands of non-native workers onto tribal land to work. The housing areas set up for these workers are referred to as “man camps”. Historically, these man camps have increased sex and drug trafficking, murder, assault, etc wherever they are established.
The environmental and social implications of the LNG refinery are violent at best.
Please hold true to the values and priorities of the PSCAA and deny the clean air permit for this facility!

Thank you,
Margaret Shiple

[05:10:07] So, next up is LaDonna Robertson. Joanna Shoetler?

Joanna: Joanna Shoetler, lifetime Washingtonian. Family member is Stewart Middle School, so we've been around for a long time, probably fifth generation Shoetler, if you really go back. And I'm in Seattle, at this point. And I really don't know what I want to say. But thank you. I want to also say I do want to acknowledge that we're on Puyallup land. And whatever they have recommended, I agree with them. And I also agree with everybody who says that the report is insufficient.

[05:11:03] And it is too bad that there aren't two people that should be here on this panel that haven't been elected for this panel, which is too bad, as well. So, I would like to talk about the orcas. I would like to talk about the tar sands. And I think I also want to talk about the immigrants, which I just read right now about that are coming up from Central America because it's all connected to everything. Mostly, we're dealing with climate change. And we're looking at different things we need to do. But we've really got to also look at the orcas. We have 74 left. When I started working on fossil fuel projects in 2012, I wrote down 89, I think it was.

And every time I review another hearing, meeting, comments, I have to take one orca off my numbers, another one and another one. So, we're dealing with salmon.

[05:12:00] We're dealing with creel, we're dealing with all of the different things that they need. But we need the water. We need the fresh water. And that's not what this project is for. LNG, it pollutes the water. It kills water. I talked to the Native Americans and the First Nations up in tar sands area. They have to pull bears out of these tar sand pits, just to think about coming across it. And what about the birds that have to fly into these tar sand pits? We've lost thousands and thousands and thousands because of that. So, now, we're going to go back to the immigrants that are coming up from Central America.

I know that it sounds crazy, but I just read it's all about climate change. It's about their farms, about the coffee and everything. And they just don't have it anymore. Well, that's going to be happening here, too, because, if this LNG goes in, the quality of life is going to go down. And I haven't heard anything, in the last couple of hours, what we really have to go to is, this week, came out with Mount Rainier, Mount Baker are the last top three volcanoes that could go.

1155

1155-2 22. General Opposition
1155-2 3. Outside of SEIS Scope

[05:13:10] We all know every day could be our last day of a wonderful place here because we know, when that mountain goes, we're screwed. And when that mountain goes, and we have that LNG plant going and we have to keep it at 200 degrees below centigrade, what's going to happen to the power? What's going to happen when that thing can't go? I hope they have generators. Have we talked about generators there? Are they going to have a generator? Because if it doesn't, that thing is going 3 to 5 miles out. And I'm sorry, but I'd be really scared about that. And I'm really scared because it will go up over that mountain in Federal Way.

I don't know, is there anyone from Federal Way here? But all the way across the Commencement Bay all the way up to the Hilltop and more.

[05:14:00] I'd be really scared about this plant, especially when they're all over the country and all over the world, they're blowing up all over the place. That's all I can say. Protect the salmon, protect the orcas, protect the treaties, and protect our way of life, before it's destroyed. Thank you.

1622-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Mariah Shriner
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project – Deny requested permit
Date: Wednesday, November 21, 2018 4:46:44 PM

Dear Puget Sound Clean Air Agency,

While I applaud the completion of the Supplemental Environmental Impact Statement to more fully evaluate the impacts of the Puget Sound Energy Liquefied Natural Gas Project, I fear that the statement is incomplete and extremely misleading.

I am extremely concerned about a number of assumptions and base calculations utilized in the report. Most significantly, the SEIS should not be referring to the 100-year value for the Global Warming Potential of methane. As the recent IPCC report underscored, we have a finite amount of time to address the root causes of climate change, on the scale of 12 years, before the impacts become even more untenable. As such, the 20-year GWP is a much more relevant number to include in calculations.

As is, it would be inappropriate for your agency to issue an air permit for the facility. I believe that the 20-year GWP for methane, closer to 86 times that of carbon, will also help illustrate just how detrimental approving this project would be – for Tacoma, the surrounding Seattle area, the Pacific Northwest, and the world.

I hope we can count on you to make the right decision and go back to the drawing board, or simply deny the project outright.

Sincerely,

Mariah Shriner

Portland, OR

1850-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Mariah Shriner
To: Public Comment
Subject: Utilize Best Available Science for SEIS – Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 4:57:08 PM

Dear Puget Sound Clean Air Agency,

While I applaud the completion of the Supplemental Environmental Impact Statement to more fully evaluate the impacts of the Puget Sound Energy Liquefied Natural Gas Project, I fear that the statement is incomplete and extremely misleading.

Please reconsider a number of the base assumptions utilized in this report including

- The 100-year Global Warming Potential for methane (the 20-year window should be utilized instead)
- The leakage rates for methane projects
- The slippage rates calculated for fuel usage

All of these numbers have been selected through a process that blatantly disregards numbers accepted as best practice and/or elects to use numbers that present the most favorable overall emissions and climate impact of the project.

As such, the analysis is incredibly flawed and it would be inappropriate for your agency to issue an air permit for the facility based on this report. I hope we can count on you to make the right decision and go back to the drawing board. When you have done so, we request that you re-open the public comment period to allow the citizens' voices to be heard.

Sincerely,

Mariah Shriner

Portland, OR

1667-1 10. LCA Calculations
1667-2 6. Purpose and Need
1667-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1667-4 13. LCA Inputs and Assumptions - Natural Gas Source

From: W Shriner
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 3:06:06 PM

Dear Puget Sound Clean Air Agency,

Thank you for providing the opportunity to review the Puget Sound Energy LNG project being built in Tacoma. We are already feeling the direct impacts of our warming planet and the science is clear -- we must act quickly to avoid catastrophic changes to the livability of our planet.

The information in the current Supplemental Environmental Impact Statement is flawed and based on inaccurate assumptions and invalid data. I am writing to request that you accurately update the SEIS and require it to be complete and credible and then re-open the public comment period so that the report can be reviewed thoroughly.

I am aware of several serious issues with the current SEIS that was issued on October 8th. These issues mislead the impact on our climate and fail to accurately reflect the risks that this project poses to the people of Tacoma, the state of Washington, and our country. The SEIS is quite flawed and any one of the issues that I am aware of would warrant a re-drafting. However, for the purposes of this comment, I will provide information on only one of the problems.

The SEIS makes several, unrealistic assumptions and mask the very real negative impacts of this project. The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers as well as the additional permitting could take years and is not guaranteed.

The SEIS says that emissions will only be reduced if the natural gas comes from British Columbia because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that fugitive emissions from BC wells and pipelines are much worse than reported.

Even if the leakage rates were accurate, this assumption is irrational. PSE does not limit the sourcing of its gas from BC and cannot honor this promise. Their recent filings show they relied on gas from BC, Alberta, and the US. Furthermore, with the recent pipeline explosion in BC that interrupted PSE's supply, we know it is not always available.

Thanks again for initiating this crucially important review of this facility and I hope that you will use the best available science when revising this draft SEIS.

Sincerely,

Walter Shriner, PhD
Portland, OR 97213

1655-1 6. Purpose and Need
1655-2 13. LCA Inputs and Assumptions - Natural Gas Source
1655-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1655-4 3. Outside of SEIS Scope
1655-5 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Wally Shriner
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 3:15:23 PM

Dear Puget Sound Clean Air Agency,

Thank you for allowing the opportunity to review the Puget Sound Energy LNG project being built in Tacoma. We are already feeling the direct impacts of our warming planet and the science is clear -- we must act quickly to avoid catastrophic changes to the livability of our planet.

The information in the current Supplemental Environmental Impact Statement is flawed and based on inaccurate assumptions and invalid data. I am writing to request that you accurately update the SEIS and require it to be complete and credible and then re-open the public comment period so that the report can be reviewed thoroughly.

I am aware of several serious issues with the current SEIS that was issued on October 8th. These issues mislead the impact on our climate and fail to accurately reflect the risks that this project poses to the people of Tacoma, the state of Washington, and our country. The SEIS is quite flawed and any one of the issues that I am aware of would warrant a re-drafting.

The SEIS makes several, unrealistic assumptions and mask the very real negative impacts of this project:

<!--[if !supportLists]-->1. <!--[endif]-->The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have.

<!--[if !supportLists]-->2. <!--[endif]-->The SEIS indicates that emissions will only be reduced if the methane comes from British Columbia. This is currently untrue and promise they can't make.

<!--[if !supportLists]-->3. <!--[endif]-->The leakage data for methane sources is inaccurate and underestimated, and doesn't include important emissions sources that by themselves are "relatively small" but add up to serious greenhouse impacts.

<!--[if !supportLists]-->4. <!--[endif]-->Fugitive emissions from pipelines and pipeline explosions are not accounted for.

<!--[if !supportLists]-->5. <!--[endif]-->Slippage rates from ships using the fuel are calculated with a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Walter Shriner, PhD

Portland, OR 97213

1872-1 5. Regulatory Framework

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

The proposed project violates the rights of native tribes. The rights of the Puyallup to be the deciding voice is critical to any discussion of impacts.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Walter Shriner Email: wmspdx@gmail.com

Address: 2235 NE 43rd Ave, PORTLAND, OR 97213

By completing this comment card you agree to receive updates about the project.

1899-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Name

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The fundamental calculations of impact are based on inaccurate and inappropriate values. In particular, the DSEIS underestimates the GWP and of methane, the analysis is over too long ~~that~~ a time period (100 vs 20 year) and leakage rates.

(Check here to continue comments on the other side.)

In addition, a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required and adequate consultation with the Puyallup Tribe and other neighbors of the project should be conducted.

Name: Walter Shriner, PhD Email: wmspdx@gmail.com

Address: 2235 NE 43rd Ave, Portland, OR 97213

By completing this comment card you agree to receive updates about the project.

Steve: Okay. Next up is Terry Velasco. Before I get the next five started here, let me give you just a heads up for the next group after that. It would be Bethany Llewellyn, June Bluespruce, Abigail Castle, Lynn Fitz Hugh, and Meredith Neal.

[03:38:09] So, next up, I'm not sure if I can read this. It's Mary Morgan? Did I get that right, Morgan? Okay. Next, is Zoe Shurman.

Zoe: I'm Zoe Shurman, and I'm 12 years old. I'm a member of Plant for the Planet, a youth led organization trying to plant a trillion trees all around the world to mitigate climate change. And I'm also part of Zero Hour, another youth led organization addressing social justice and climate issues. We know that fracked gas produces less carbon emissions than coal when burned.

[03:39:00] But the problem is the extraction, the transmission, the processing, storage, and distribution of fracked gas plus the burning of it. Add it all up, it leaks large amounts of CO_2, methane, ammonia, arsenic, cadmium, hydrogen sulfide, and sulfur dioxide. When accounting for methane leaks, fracked gas has climate impacts that definitely rival those of coal. This is the opposite of the direction that we need to be going in. These chemicals, when released into the air, are horrible for human health causing and inflaming asthma, contributing to heart disease and stroke, and significantly decreasing life expectancy.

This facility would also emit volatile organic compounds like mentioned earlier or rocks, which have been linked to birth defects, have been shown to cause cancer, and have shown to just, in general, negatively affect the nervous system. Another thing is that the draft SEIS uses an outdated methane global warming potential value.

[03:40:02] Just using basic common sense, experts who study climate change as their jobs have these updated numbers. And it makes no sense not to use them. They are the only numbers relevant today. And they are the only ones that matter for my life, for my generation, and for my time. The old numbers have nothing to do with the coming years. No actuary will use them and no insurer. They have to use information that best reflects reality. The old methane numbers are only useful for accommodating the interests of the investors in this project.

If you are going to act in an accountable way to me and every child

1241-1 21. LCA Inputs and Assumptions - Additional Air Pollutants
1241-2 22. General Opposition
1241-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

in this region, you have to answer truthfully whether this is going to contribute to sea level rise, whether this is going to heavily contribute to more pollution in our atmosphere, whether this is going to contribute to throwing our agricultural system into disarray, and whether you all are going to let this happen, when all of us know the answer to all of these questions. Me and my generation are relying on the adults in our world to make the right choices.

[03:41:00] And so far, this has, generally, not happened. We need you to stand with us this time. Thank you.

Steve: Thank you. Next would be Lula Pritchard.

[03:27:00] Don Golden? Mary T. Andrews Yarbrough? Mary? So, before I call the next five up, just a heads up, the next group after that is it Morgan Michael, Zoe Shurman, Jamie Margolin, Jeffrey Grinstead, and Karen Stocker. So, Benjamin Sibelman?

Benjamin: My name is Benjamin Sibelman. I am an environmental activist and also one of the caregivers for a girl who just turned 1 year old in our community house in Seattle.

[03:28:05] And, yesterday, I went to a rally held by a children led group, Plant for the Planet, because it's the children that are going to be feeling the impact of runaway climate disruption, if we allow that to happen. I honor the concerns of people in Tacoma whose children could be breathing somewhat cleaner air as a result of replacing some of the ships' fuel with LNG. And I believe in finding some way for the children to breathe cleaner air, but this is not it. The solution can't just be this illegally built plant with no permit. It's violating the treaties. It's in a terrible location. It's a lesser evil, at best, in terms of children's lungs.

And last year, you announced that this plant would emit ammonia, arsenic, cadmium, hydrogen sulfide and other things.

[03:29:06] And then, there's the children who live near the fracking sites, which fracking has been demonstrated to cause huge amounts of water pollution, air pollution, use up a lot of fresh water that's just pumped in with weird chemicals into the bedrock. And finally, this is the wrong solution because it's locking in 40 more years of using fossil fuels. We have 20 years, and do we still want this happening in 2060? That's crazy. We need a third way. We need all of the ships here to be using shore power. There are hybrid tugboats out there and electric tugboats are being developed and tested now.

Those could tow ships in and out of the port. And we also need to start converting the gas stoves in our houses, which are also causing pollution that's hurting our lungs.

[03:30:08] The answer is electricity and renewable electricity. Thank you.

1108

1108-1 3. Outside of SEIS Scope

1441-1 22. General Opposition

From: Judith Sibelman Sibelman
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 5:59:59 PM

Name: Judith Sibelman Sibelman
Email: sib@hevanet.com
Address: 6640 SW Juniper Terrace -
BEAVERTON, Oregon 97008

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

You close your eyes to reality, but you can't wish it away. Whom will energy companies sell fossil fuels to when earth is uninhabitable? And by the way, fucking over indigenous tribes is as disgusting as it has been since 1492. Did I mention the consequences of liquefaction during the overdue mega-quake?

I'm so tired of urging you idiots to wake up -- you can't seem to find your own best interests with both hands. Go ahead. Kill us all a little quicker. Maybe when we're finally gone, the earth can begin to recover from the cancer that is us. Or maybe that possibility is already gone.

Think of all the life. Think of all the death. Then do the right thing.

2206-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2206-2 13. LCA Inputs and Assumptions - Natural Gas Source
2206-3 7. SEPA Alternatives
2206-4 7. SEPA Alternatives
2206-5 7. SEPA Alternatives
2206-6 5. Regulatory Framework

From: carol.sibley@everyactioncustom.com on behalf of Carol Sibley
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 12:37:48 PM

Dear Responsible Official,

I oppose the Puget Sound Energy and Tote Marine proposal to build a new, large LNG terminal in Tacoma.

Your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis is a step forward.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the “no-action alternative” to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the “no-action alternative” to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency’s established goals. Alternatively a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives could contribute to cleaner maritime traffic.

Clean local emissions requirements can be achieved by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of my comments.

Sincerely,
Carol Sibley
Seattle, WA 98103
carol.sibley@wwarn.org

1520-1 22. General Opposition

From: Judy Sierra
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:03 PM

Name: Judy Sierra
Email: judysbooks@gmail.com
Address: 7909 SW 31st Avenue - Apt 6
Portland, Oregon 97219-3782

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I am a resident of Portland, Oregon, and I oppose this fracked gas terminal. I don't believe the analysis of the impact of shipping and storing and burning the gas is complete or reliable, or that it takes human lives into account. AThe Puget Sound Clean Air Agency has promised to be good and wise stewards of resources, defend the future, and prevent and reduce risk. The plan for the terminal does not take into account latest predictions about global warming. It poses an irresponsible betrayal of our children and grandchildren.

1382-1 22. General Opposition

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:19 PM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista - Sigler
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a terrible idea! Fracking contributes to methane release, an awful greenhouse gas. We need to keep it in the ground and fund clean, renewable alternatives.

1394-1 22. General Opposition

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:05 PM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista - Sigler
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a terrible idea! Fracking contributes to methane release, an awful greenhouse gas. We need to keep it in the ground and fund clean, renewable alternatives.

1406-1 22. General Opposition

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:55 PM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista - Sigler
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a terrible idea! Fracking contributes to methane release, an awful greenhouse gas. We need to keep it in the ground and fund clean, renewable alternatives.

1427-1 22. General Opposition

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:40 PM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista - Sigler
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a terrible idea! Fracking contributes to methane release, an awful greenhouse gas. We need to keep it in the ground and fund clean, renewable alternatives.

1428-1 22. General Opposition

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 11:56:03 AM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista - Sigler
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a terrible idea! Fracking contributes to methane release, an awful greenhouse gas. We need to keep it in the ground and fund clean, renewable alternatives.

1491-1 3. Outside of SEIS Scope

From: Dean Sigler
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 6:55:39 PM

Name: Dean Sigler
Email: muchcatfur@comcast.net
Address: 18845 SW Vista St -
Aloha, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Fracking and its products are destructive of the land and waters. The process is associated with earthquakes, which have now been reported at the first fracking site in northern England. The release of methane in the Porter Ranch/Aliso Canyon incident drove over 15,000 people from their homes for four months. This is a risky, demonstrably harmful process and needs to be replaced by reliance on renewable, non-fossil fuel energy.

2213-1 22. General Opposition

From: patriciasilver@everyactioncustom.com on behalf of Patricia Silver
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 10:56:07 AM

Dear Responsible Official,

TAKE THE TIME TO DO A COMPREHENSIVE STUDY.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

Sincerely,
Patricia Silver
Berkeley, CA 94707
patriciasilver@earthlink.net

1177-1 23. General Support

Carole: Thank you. Lisa Simmons?

Lisa: Hello. There we go. My name is Lisa Simmons. I'm here in support of the project on two fronts. The first is I'm a long term resident here of Tacoma. I've always lived pretty central, hill top, and I live by Lincoln. And secondly as an employee of TOTE Maritime Alaska. I'm in support of this project because I do believe that it is a step forward. I'm in support of my company because I think that they're actually putting their money where their mouth is and investing in the future of this community, investing in the environment.

[01:28:03] We know that there is no renewable fuel source, for shipping, right now. There's no renewable fuel source for transportation. So, every year that we're not trying to be better, we're just keeping it as it is. It's more particulate matter in the air. It's more CO2. It's more greenhouse gases. I live here. I run. I'm trying to buy a house. We'll see how it goes. But I want something better, and I'm proud to be in an area that is willing to take this step forward. And I'm proud to work for a company that's willing to stick their necks out and try to be better. So, that's everything.

Carole: Thank you. Laura Skelton?

Laura: Thank you. My name is Laura Skelton, and I'm the executive director of Washington Physicians for Social Responsibility. Our organization is made up of hundreds of doctors, nurses, and public health professionals who work to protect the health of Washingtonians from major threats, including climate change and pollution.

[02:20:04] We have dozens of members here in Tacoma whose primary concern is the health of this community. As we have learned more about this project, we have grown more concerned. Today, I'm here to request improvements to the draft Supplemental Environmental Impact Statement and to express our support for the Puyallup Tribe's position. I also want to state our grave concerns with the entire fracked gas industry. Simply put, fracking is terrible for health. The gas for this facility would most likely come from Canada where fracking pollutes air, soil, and water.

We are not interested in trading the harms associated with bunker fuel for the harms associated with fracking and LNG. We are deeply concerned about climate change, which is widely thought to be the biggest public health challenge of this century. We believe the SEIS underestimates this project's likely contributions to climate change.

[02:21:02] Why not use the scientifically accepted, 20 year global warming potential of methane to estimate this project's contributions to climate change in its first two decades? We also encourage the agency to take another look at its methane leakage assumptions. Newer data suggests that the methane leakage rates in British Columbia are significantly higher than those reported in the SEIS. Lastly, it is our understanding that TOTE is already using ultra low sulfur diesel. The build out of this facility and associated pipelines will create demands for more gas coming through our region, which poses a risk of explosion and fire in a very busy port. Is this risk truly necessary?

Further, building this facility commits us to using more fossil fuels at a time when we urgently need to move to truly clean energy. We urge you to revise the SEIS with the best and latest science, so that the public can better understand the true costs of this project.

[02:22:00] Thank you.

1174-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1174-2 14. LCA Inputs and Assumptions - Leakage/Slippage

From: CURT SMITCH
To: Public Comment
Subject: TOTE Public Comment
Date: Wednesday, November 21, 2018 11:39:45 AM
Attachments: curt"s final with signature.pdf

Thank you for the opportunity to comment on the TOTE project.

Respectfully,

Curt Smitch

November 20, 2018

PSCAA
Attn: Public Comment
1904 3rd Ave
Suite 105
Seattle, WA 98101

To Whom It May Concern:

Every day the urgency of environmental progress in our region seems to escalate. The health of local waterways that empty into Puget Sound, the fluctuating populations of iconic species like salmon and orca and the ongoing challenge to manage forest fires are high profile examples of environmental challenges we face. Residents and businesses are asked to consider what they can do to reduce their own footprint upon the environment – from recycling and composting, to using 'salmon safe' car wash services hybrid and electric vehicles., to LED lighting, remote workplaces and carpooling, among many others.

On occasion an entire industry has the opportunity to adopt greener practices, which is the case for the shipping industry in Tacoma. Traditionally powered by diesel fuel, cargo ships across the world are increasingly retrofitted to run on liquefied natural gas. This upgrade results in significant reductions in dangerous air emissions and leads to improved air quality. I believe the upgrade allows for an essential transition that has a measurable positive impact on air quality for years to come. I would hope that PSCAA and the City of Tacoma rewards TOTE for going beyond what is required to improve our overall air quality.

Let's be specific about the emissions reductions. LNG offers a cleaner alternative to diesel, which the American Lung Association says can aggravate respiratory and cardiovascular disease, cause chronic bronchitis, asthma, lung inflammation and emphysema, and lead to cancer. Switching from diesel to LNG as a shipping fuel will reduce sulfur emissions by 100%, harmful diesel particulate matter by more than 90%, nitric oxide and nitrogen dioxide emissions by 90% and carbon dioxide emissions by 20%.

While the benefit to the environment is undeniable, there is a business imperative driving the upgrade. As noted by Reuters in June 2018, "Driving the shift are new rules from the International Maritime Organization that cut the allowed sulfur content in marine fuel to 0.5 percent from 3.5 percent by January 2020. *LNG is virtually sulfur free.*"

If we are as committed to safeguarding the local environment as much as we say we are, then we must seriously consider every technological advance that enables us to incrementally withdraw from fossil fuels. We all know things just don't happen overnight. Tote converting their ships to LNG is true generational environmental progress. The Port of Tacoma has the opportunity right now to positively impact environmental air quality with an upgrade that not only benefits a well-established local company but will support residents and Port workers who are challenged by respiratory and/or cardiovascular illness.

The LNG facility proposed at the Port of Tacoma should be supported by everyone who agrees we must take steps – now – to improve our local air quality, and to put us on a steady path toward cleaner fuels needed to power our daily lives.

Your own SEIS documents a 13.5% reduction in greenhouse gases, not to mention the reduction in Sulphur Oxides – 100%, Particulate Matter by 99% and Nitrogen Oxides by 90%. While your focus is air quality, you should seriously consider the benefits to the marine environment. The reductions in carbon and particulate matter will benefit the dwindling populations of salmon and orcas.

Regards,



Senior Policy Advisor for former Governor Booth Gardner
Senior Policy Advisor for former Governor Gary Locke;
Former Director Governor's Salmon Recovery Office
Former Director Washington Department of Wildlife

2551-1 3. Outside of SEIS Scope
2551-2 22. General Opposition
2551-3 3. Outside of SEIS Scope
2551-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2551-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2551-6 7. SEPA Alternatives
2551-7 7. SEPA Alternatives

From: detoxhealth@everyactioncustom.com on behalf of audrey smith
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, November 21, 2018 9:16:17 PM

Dear Responsible Official,

I am writing this to tell you how I feel about having a fracked gas tank within blast zone of my home and near an earthquake zone. I also want you to know how disappointed and shocked I feel that your Council ever thought to accept this concept and to allow this great concern shown via meetings, numerous demonstrations and letters from the community, as well as the Tribe to go on for so long!

Please do not wait for an environmental study! Stop this now. It is time to consider new uses of the land on the flats. This holding out on your part seems like a wrong use of your power!!

Huge efforts have brought Tacoma area to great things by covering the blight of Asarco. The cleanup is not done, regarding wildlife, fish, environment, water. Let's continue to honor Tacoma.

****

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
audrey smith
Tacoma, WA 98407
detoxhealth@yahoo.com

1787-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 12:49:09 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

It's time to stop burning our air for short term profits.

Sincerely,

Frank Smith
rollingdog@hctc.com
98584

1494-1 22. General Opposition

From: Jerry Smith
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:47 PM

Name: Jerry Smith
Email: digjerrydig@gmail.com
Address: 5041 Saxon Way -
Eugene, Oregon 97405

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

No new methane, no new carbon. America and the world is in great trouble. Stop making it worse.

1656-2 10. LCA Calculations
1656-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1656-3 13. LCA Inputs and Assumptions - Natural Gas Source
1656-4 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Kahlo Smith
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 6:42:23 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Many thanks for opening up a review process! As a young American, I'm concerned about our nation's continued mistreatment of the environment. Global issues including climate change, ocean acidification, and air and water pollution threaten my future— and more importantly, the millions of citizens in developing nations without access to the technology and freedom of movement that would allow me to evade the negative effects of environmental degradation. I know you've probably received hundreds of similar messages, but I emphatically believe in the importance of transitioning to sustainable clean energy sources.

As I understand it, the public takes issue with your report on these points:

The data is incomplete. The impact estimates of the project are relevant to an innapropriately long time-span considering the length of the project. Estimates related to sourcing of gas are innacurate. The SEIS did not factor in a high-enough slippage rate.

I look forward to the submission of an updated report in line with these concerns.

Thanks again!!
Kahlo

Kahlo Smith
kahlo@ucsb.edu
6774 Highway 9
Felton, California 95018

1756-1 10. LCA Calculations

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 9:13:06 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Please stop using market values to over-ride healthy community values - fossil fuels must stop being produced now if we are going to live together and live long.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project

Sincerely,

Kent Smith
kent@binau.com
98119

1754-1 10. LCA Calculations

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 10:35:16 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Draft SEIS is Incomplete – There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project

Sincerely,

S Smith
555blue@gmail.com
98400

1777-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 5:47:15 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Protect our environment over Australian profits!

Sincerely,

S Smith
555blue@yahoo.com
98400

0451-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name SARAH SMITH

Address or email Sarahbildrithsmith@gmail.com

This Pipeline Is Wrong. It invades tribal land and violates the treaties created to give autonomy to the native people. It jeopardizes the heartbeat of the Puget Sound & Salish Sea. It risks our children's futures and gambles their health away for the bottom line of a corporate budget.

Only TWO exits exist in case of an emergency. The gas is subsidized by the people of Tacoma and shipped away from them. The shipping companies receive tax breaks that the people of Tacoma have to pay for while THEIR resources are exploited, THEIR futures are risked

and their Childrens' lives are put in Danger.

This is blatant racial disparity with the inmates at the Detention Center in the blast zone, treated like expendable mucks. This is NOT right.

PSE's actions, cherry picked data, and flagrant disregard of the affect this plant will have alone should be cause to halt this pipeline.

Green energy is the future. For every 1 job in fossil fuel, green energy creates 4. This is a dying industry. We need to invest in thriving, long-term energy that doesn't require us to kill ourselves to have it.

— Sarah Smith

Steve: Okay. Lynn Dinino? Kathryn Lewandowsky? Ezekiel Smith? Oh, go ahead.

Zeke: Zeke Smith. Deny this permit. Ultimately, it is just another brick in the Trump Pence wall against Native rights, against environmental progress, against human rights, and against the planet itself.

[06:34:12] Trump's make America great again is a 21st century fascist program of manifest destiny. America first wrapped in the flag and Mike Pence's Bible taken literally, with a program of white supremacy, misogyny, and xenophobia. This regime denies truth and objective evidence. This regime denies truth and objective evidence. And yet, it has its hands on the most powerful military and nuclear arsenal in history and is preparing and threatening to use it. Millions of immigrants live in terror, fearing their loved ones will be ripped away. People's humanity is viciously denied. Women are poised to lose the right to abortion.

[06:35:00] Trump and Sessions have instructed police to take the gloves off further brutalizing people of color. LGBTQ rights recently won are under assault. Damage done to the environment by this regime in just the period of 14 months could be irreversible. Regardless of whether you voted, no matter who wins, we must be in the streets beginning the day after the midterm elections to demand and demonstrate our determination that, in the name of humanity, the Trump Pence regime must go. Protest Wednesday, November 7, 6:00 p.m., the day after the midterms at Cal Anderson Park, Seattle.

And protest Saturday, November 10 1:00 p.m.. Cal Anderson Park, Seattle. And deny this permit. Thank you.

From: Zeke Smith
To: Public Comment
Subject: Video of public comments
Date: Thursday, November 1, 2018 11:52:26 AM

Is video available of the recent public comments in Tacoma at the Rialto?

Testimony LNG Facility in Tacoma
November 30, 2018

Let me see if I have this right. PSE wants this facility in Tacoma to sell LNG to Asia as well as use it as resource for other purposes. Regardless of the estimated leakage rate for methane in the draft SEIS, the consensus estimate for methane leaks from fracked gas seems to be around 3%. This release of methane combined with the burning of fracked gas roughly is the GHG equivalent of burning coal to generate electricity. So what PSE really wants to do is to export coal plants to China minus the particulates.

It is my understanding that the recent UN Intergovernmental Panel on Climate Change just reported that the world is not on track to meet the goals set by the 2015 Paris Climate Accord and that we are on track to blow through our carbon budget to keep temperatures within 2°C never mind a goal of 1.5°C. In fact according to the report, we only have 10 to 15 years to make dramatic improvements in reduction of GHG to stay within our carbon budget. Many scientists think we are already too late to address these issues with just renewable energy and improved energy efficiency. They are starting to call on governments to begin huge R&D projects to figure out ways to extract massive amounts of CO^2 out of the atmosphere in order to avoid the most catastrophic impacts of climate change. Right now we have no idea how to pull CO^2 out of the atmosphere beyond planting trees and modifying soil management practices. Nor do we have any real idea how much such technology would cost although some estimates are as high as $200 per ton of CO^2.

This is utter madness! Why should we be having this conversation in 2018 with what we now know about the accelerating rate of climate change? Under no circumstances should be we be building any form of new fossil fuel infrastructure in the State of Washington. The Puget Sound Clean Air Agency should deny the air permit for this facility, a facility which PSE has begun illegally without proper permitting. Any other decision is morally and fiscally irresponsible.

Ronald Snell
Kirkland, WA,
rsnell2@comcast.net

0443-1 22. General Opposition
0443-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0443-3 3. Outside of SEIS Scope
0443-4 8. No Action Alternative

Carole: Thank you. Ronald Snell?

Ronald: Thank you for the opportunity to speak this afternoon. My name is Ron Snell. I live in Kirkland, Washington. And I am also speaking as a grandfather. I have two granddaughters. One lives here in the Puget Sound region and the other in Colorado. Both of them are going to be negatively impacted by this project. PSE's long term plan, as I understand it, for this project, is to sell LNG to Asian markets for which there is a booming market.

[02:18:04] Unfortunately, the estimates in the SEIS are woefully inadequate, in terms of methane leakage. The consensus estimate for methane leaks around fracked gas seems to be around three percent. At this rate, release of methane, combined with the burning of fracked gas, is roughly the greenhouse gas equivalent of burning coal to generate electricity. So, what PSE is really proposing to do is to export coal plants to China minus the particulates. We know, from the recent IPCC report that a number of people have referred to that we're approaching a crisis in our climate.

It is so severe that many scientists no longer believe we can get to meet our climate goals simply with renewable energy and with energy efficiency. They are starting to call on massive government investment in CO_2 technologies to pull CO_2 out of the atmosphere.

[02:19:03] We don't know how to do that. We have no idea what it's going to cost, but some estimates are as high as $200.00 per ton. I don't understand why we're having the conversation we are today facing a climate crisis that we are. This feels like utter madness. Under no circumstances should we be building any new fossil fuel infrastructure in the state of Washington. Any other decision is morally and fiscally irresponsible. Thank you.

2573-1 22. General Opposition
2573-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2573-3 13. LCA Inputs and Assumptions - Natural Gas Source
2573-4 7. SEPA Alternatives
2573-5 19. LCA Inputs and Assumptions - End Use
2573-6 10. LCA Calculations

From: lindatfinney@everyactioncustom.com on behalf of Walther Soeldner
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Saturday, October 27, 2018 8:07:22 AM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project.

The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016.

It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. The SEIS also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow.

The draft SEIS should be thoroughly edited and released for a new full public comment period. The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal.
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited

and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Walther Soeldner
13613 S Valley Chapel Rd Valleyford, WA 99036-9767

2573-6 cont'd 10. LCA Calculations
2573-7 22. General Opposition

0736-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Robert Soltess

Address or email 4819 Old Stump Dr. NW, Gig Harbor WA 98332

In order to properly inform the decision makers and to assure the citizens that those decisions are based on a fair and reasonable technical assessment, the DSEIS requires a significant revision. Values for the global warming potential of methane must be updated to reflect the latest scientific consensus. In addition, the DSEIS must use the 20 year GWP of methane rather than the 100y GWP. Finally, adopting the best possible information on methane leakage should be incorporated.

The PSCAA, at a minimum, must ensure a comprehensive, fair and current DSEIS. Please make the above revisions so all parties can be confident that subsequent decisions are based on the best information available.

Thank you.

2018-1 23. General Support

From: Pooja Soni
To: Public Comment
Subject: Tacoma LNG Permit
Date: Wednesday, November 21, 2018 9:12:10 AM

Hello,

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Based on draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) on October 8, 2018, I encourage the agency to issue the necessary permits for the project to proceed.

We all need to be good stewards of environment and make responsible decisions at local, state and federal levels. All the information reviewed thus far regarding this project gives me confidence that proceeding with the project is the responsible thing to do for the community and overall environment. LNG is a cleaner fuel than Diesel so PSCAA needs to act appropriately and support PSE in making this project a success.

Sincerely,
Pooja Soni
Federal Way, WA 98023

2019-1 23. General Support

From: Ron
To: Public Comment
Subject: Tacoma LNG Permit
Date: Monday, November 19, 2018 10:55:28 AM

Hello,

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. Based on draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) on October 8, 2018, I encourage the agency to issue the necessary permits for the project to proceed.

We all need to be good stewards of environment and make responsible decisions at local, state and federal levels. All the information reviewed thus far regarding this project gives me confidence that proceeding with the project is the responsible thing to do for the community and overall environment. LNG is a cleaner fuel than Diesel so PSCAA needs to act appropriately and support PSE in making this project a success.

Sincerely,
Ronak Soni
Federal Way, WA 98023

1348-1 22. General Opposition

From: Paul Spindel
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 8:39:57 AM

Name: Paul Spindel
Email: pspindel@msn.com
Address: 1465 Holly St -
West Linn, Oregon 97068-3354

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We need to do better. Stop this project

1858-1 3. Outside of SEIS Scope

Name Jane Stackhouse

solution. Tacoma is one of the county's Superfund sites. We need to clean it up, not add to the contaminants.

We should stop the construction solely on the grounds of those contaminants.

If it was then consider the existential threat of more green house gases in the global atmosphere there is no scientifically based argument to continue the project.

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

ATTN: Public Comment on DSEIS, PSE LNG Project

Dear Puget Sound Clean Air Agency,

I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The proposed LNG plant in Tacoma will release ammonia, arsenic, cadmium, hydrogen sulfide, and sulfur dioxide and emit volatile organic compounds. All this pollution has been linked to birth defects and cancer and harm the nervous (Check here to continue comments on the other side). ✓

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Jane Stackhouse Email: jane@janestackhouse.com

Address: 2133 NE Broze St, Portland, OR 97212

By signing this comment card you agree to receive updates about the project.

1859-1 14. LCA Inputs and Assumptions - Leakage/Slippage

Name

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

The data is clear that we must stop contributing to greenhouse gases now. Any emission of methane is unacceptable. Because methane is 87 times more potent than CO_2 in trapping heat the SEIS should use the 20year GWP (96) (Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Jane Stackhouse Email: jane@janestackhouse.com
Address: 2133 NE Brazee, Portland, OR 97212

By signing this comment card you agree to receive updates about the project.

1860-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Climate disruption makes clear that we must change the economics of energy generation. During this transition we must avoid investments that will be left stranded. Example: this 40 year plan that will have to be aborted within 12 years.

(Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Jane Stackhouse Email: jane@janestackhouse.com

Address: 2133 NE Brazee St. Portland, OR 97212

By signing this comment card you agree to receive updates about the project.

RECEIVED
NOV 19 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, 1904 Third Ave, Suite 105, Seattle, WA 98101
ATTN: Public Comment on DSEIS, PSE LNG Project
Dear Puget Sound Clean Air Agency,
I strongly oppose the Puget Sound Energy Liquefied Natural Gas Project and urge you to deny the permit because the Draft Supplemental Environmental Impact Statement does not accurately represent the true greenhouse gas emission profile of the project. I have the following specific concerns:

Now is the time to stop treaty violations. The Puyallup Tribe has lived on this land before white explorers set foot on the East Coast. They are good stewards of the land and water. Do not violate the Medicine Creek Treaty

(Check here to continue comments on the other side).

In addition a Supplemental Environmental Impact Statement addressing health and safety aspects of the project should be required, and consultation with the Puyallup Tribe and other neighbors of the proje must be done.

Name: Jane Stackhouse Email: jane@janestackhouse.com
Address: 2133 NE Brazee St, Portland, OR 97212

By signing this comment card you agree to receive updates about the project.

1983-1 23. General Support

From: Nstag
To: Public Comment
Subject: PSE LNG Project Comment
Date: Tuesday, October 30, 2018 11:34:30 PM

To Whom It May Concern;

The Puget Sound Clean Air Agency's requirement for a "complete quantitative analysis of greenhouse emissions upstream and downstream of the LNG facility operations" in the final EIS of the PSE LNG project is just another example of the obstructionist policy and actions of our state's liberal agencies. Will this same clean air environmental review requirement be applied to other important industries operating within Washington State such as aircraft manufacturing, retail business, DOD, etc?

If not, why not? The answer is obvious. If it were so, we wouldn't be building another airplane, erecting another supermarket, or supporting another military troop for a long time - if ever again. Think about the 'upstream' energy consumption and greenhouse gasses produced to actually mine, transport, process, manufacture, and deliver all of the raw materials and items it takes to build airplanes, support our military, or supply the everyday items bought in our supermarkets. Think about the amount of energy and greenhouse gasses produced to do all that just to preserve our quality of living and maintain our freedom. Then, look at the 'downstream' greenhouse gas impacts over the life-cycle of all the flights of that one airplane, supporting and maintaining the thousands of troops and equipment at one of our local military bases, or the millions of truck and automobile trips to and from the supermarket required to supply and purchase all the items to feed and clothe our families.

The construction of the LNG plant in the Tacoma Tideflats should be allowed to proceed as planned. Washington State agencies need to stop being political tools and start being more honest and realistic. The LNG is going to produce less greenhouse gasses than burning marine diesel, unless of course the ultimate goal is to end all commerce. This project is safe, energy efficient, and environmentally better - and it should proceed. Let's put that gem of a port to work for us!

Nick Stagliano
Resident, NE Tacoma
(253) 927-5959

2553-1 22. General Opposition
2553-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2553-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Grace Stahre
To: Public Comment
Subject: Tacoma LNG SEIS Project Public Comment
Date: Wednesday, October 31, 2018 1:58:20 PM

Grace Stahre
1471 20th Ave
Seattle, WA 98122

October 31, 2018

Dear Carole J. Cenci,

I am the mother of 2 children who are active with Plant for the Planet, an organization that took over the United Nations Environment Program's international tree planting program to fight climate change, and we are members of 350.org.

Every single day these kids are speaking to other kids about climate change, writing letters, giving speeches, attending rallies, writing public comments, or planting trees.

They don't stop, because they don't see most adults doing ANYTHING substantial to stop the impending challenges of climate change. They know that when our agricultural system is destabilized, and we are stealing water from other states, and we are locked in wars for resources, they will also be caring for their aging parents. This is not a scene any of us want.

We want a future where we get to learn, and love, and contribute to the betterment of society... This plant stands in the way of that dream.

They are very well aware the fossil fuel companies have known this about this problem since the 1970's, and their disbelief in our inaction is devastating to me. Because I'm one of the people who didn't act and knew. I have to make that up to them now.

The only messaging I see in support of this facility is FROM the industry. The only numbers that are positive come FROM the industry. The only people that want this are FROM the industry, in addition to some local people that they've sold on the concept that it will reduce port pollution... AT THE EXPENSE OF THE ENTIRE PLANET.

It was even more painful to be present at the hearing yesterday and to see how many people who live near the facility spoke - and how many of them had clear physical disabilities, and potentially other disabilities as well. It was outright shameful that this was dumped on the people are least able to defend themselves.

Here's what is apparent -

PSE is LYING about their expected methane leaks. Every climate scientist that I've spoken to and hear testify backs this up. The numbers that PSE gives are not just off, they are completely disingenuous given what WE KNOW about ALL other projects of this type. My kids know they are lying. At this moment, hundreds of kids across the district know. And they are learning what is being stolen from them.

I'm going to get on board with this, and request the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that

methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405-12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Grace Stahre, Mother of Zoe and Alexis

2553-3 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
2553-4 7. SEPA Alternatives
2553-5 7. SEPA Alternatives
2553-6 22. General Opposition

2230-1 22. General Opposition

From: Ann Steel
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, October 29, 2018 11:03:12 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I am opposed to PSE's LNG project and will attend the hearings in Tacoma in solidarity with the diverse group standing against this reckless and short-sighted attempt that to hurt our community. I appreciate your review
of the impact of natural gas on our local environment and world climate. Scientists, our governor, world leaders and the majority of citizens of the Puget Sound region know that we cannot allow any further fossil fuel infrastructure to be built and must RAPIDLY transition to renewable energy sources.

I request that you complete the draft SIES report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

Thank you for your consideration.
Sincerely,

Ann H. Steel, MD, MA, LMHC
Tacoma WA

Ann Steel
ahsteel56@gmail.com
5601 N. 37th St
Tacoma, Washington 98407

From: Cathy Stegman
To: Public Comment
Subject: Tacoma LNG fracked gas storage and refinery project.
Date: Saturday, November 17, 2018 4:32:17 PM

Dear Puget Sound Clean Air Agency (PSCAA),

Stop the proposed Tacoma LNG fracked gas storage and refinery project. PSCAA holds the power to approve or deny the final permit for this disastrous project.

These are just some of the shortcomings developed by a coalition of groups including Advocates for a Cleaner Tacoma (ACT), Sierra Club, 350 Seattle, Washington Physicians for Social Responsibility (WPSR) and 350 Tacoma. One could bring up any of these in a comment:

- **The Draft SEIS is Incomplete** – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- **SEIS is Using Outdated Methane Global Warming Potential Value** – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- **Analysis is based on 100-year, not 20-year, global warming potential (GWP) values** – They base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- **Questionable claims that B.C. fracked gas is as clean as they claim –** They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- **What assurances do we have that all of the fracked gas would come from BC?** They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).
- **Analysis assumes credit for extra maritime customers that currently do not exist –** The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.
- **Questionable Methane Slippage Rates for TOTE Vessels –** It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells** –

1827-1 10. LCA Calculations
1827-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1827-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1827-4 13. LCA Inputs and Assumptions - Natural Gas Source
1827-5 6. Purpose and Need
1827-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1827-7 16. LCA Inputs and Assumptions - Hydraulic Fracturing

Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Very Sincerely,

Cathy and Todd Stegman
6306 Atlas Place SW
Seattle, WA 98136

1827-7 cont'd 16. LCA Inputs and Assumptions - Hydraulic Fracturing

2201-1 22. General Opposition

From: davesteidlecmt@everyactioncustom.com on behalf of David Steidle
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 3:07:25 PM

Dear Responsible Official,

Frack,Frack, Frack!

Sincerely,
David Steidle
Huntingdon, PA 16652
davesteidlecmt@yahoo.com

0356-1 22. General Opposition
0356-2 5. Regulatory Framework

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Bret Stein

Address or email bret.stein@yahoo.com 4519 N. Verde, Tacoma

In August my wife and I moved to Tacoma one thing we most looked forward to was living in a State that cared for the air and environment (as compared to Utah where multiple counties routinely fail air quality limits). Imagine my disappointment when I learned of the LNG facility only a few miles away.

I urge you to revisit the SEIS using up to date science, not cutting corners, and taking at all possible Situations.

I also urge you to Respect the Puyallup tribe. Do not issue this permit people are worth more than money. Supporting the LNG facility is putting individual wealth over our fellow humans.

2538-1 22. General Opposition
2538-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2538-3 14. LCA Inputs and Assumptions - Leakage/Slippage
2538-4 7. SEPA Alternatives
2538-5 7. SEPA Alternatives

From: jimsteitz@everyactioncustom.com on behalf of Jim Steitz
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, October 24, 2018 11:55:06 PM

Dear Responsible Official,

This LNG infrastructure would constitute an ecological disaster at every step in the life-cycle of the gas, from its drilling, through transport, to combustion. The Tacoma LNG export project would frustrate the maintenance of a planet that can sustain human life, serve no other valid purpose, and must therefore be rejected. We are rapidly crossing climate thresholds of no recourse, and will ordain an indefinite increase in carbon by locking in long-term gas projects. Our survival over the coming centuries depends upon moving rapidly toward a lower-carbon economy. This mathematically requires that the large majority of methane reserves remain securely underground. If this goal is to have any meaningful policy expression, then PSCAA cannot permit this project.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Jim Steitz
Gatlinburg, TN 37738
jimsteitz@mac.com

1550-1 3. Outside of SEIS Scope

From: rick semple
To: Public Comment
Cc: Robert S Thoms
Subject: Comment to Draft Supplemental Environmental Impact Statement
Date: Thursday, November 8, 2018 8:11:50 AM

Dear Puget Sound Clean Air Agency,

For over twenty years I have owned property and lived in the same (98421) zip code as the proposed LNG plant. I am familiar with the area.

In that time I have seen Tacoma clean up its aroma, its crime and start to address its lack of a downtown core. Because of these achievements I have started to believe that Tacoma's trajectory was UP

The LNG plant, as it is currently proposed, does not fit with my hopes and vision for Tacoma's future.

The Jobs often cited are not economically more productive to the local economy than building and staffing a new 7-11 store.

The environmental questions you are expert in and have heard amply addressed are real. Please review the accuracy of the science in the SEIS presented to you.

My request is that you reject this SEIS for scientific reasons, while knowing that the ordinary, informed and caring citizens of Tacoma, including me, support that decision for the future of Tacoma.

Thank You,

Rick Semple

Tacoma Board of Building Appeals

Board of Historic Tacoma

Board of Dome District Business Association

ricksemple@mac.com
253 627-1315

1844-1 10. LCA Calculations
1844-2 5. Regulatory Framework
1844-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Joseph Stenger
To: Public Comment
Subject: Tacoma LNG Terminal
Date: Tuesday, October 30, 2018 6:43:00 AM

Hello,

I am writing to express my opposition to the proposed Puget Sound Energy LNG Terminal at the Port of Tacoma. We don't need an export terminal in Puget Sound for British Columbia gas. Let the Canadians figure that out for themselves.

The draft SEIS for the project is not complete and contains at least 10 “placeholder” values instead of actual data. One of these is related to the Global Warming Potential (GWP) value for methane.

The project itself is proposed to be located on disputed Puyallup Tribal lands and is being built without their consent.

I believe that the PSCAA should complete the draft SEIS and address these and other issues relating the the project's potential impact on global climate change. In particular the analysis should assess both 20 year and 100 year impacts, especially in view of the Intergovernmental Panel on Climate Change report that establishes the need for urgent action to reduce carbon emissions in the next two decades. Then the PSCAA should re-issue the SEIS, and reset the public comment period.

Sincerely,

Joseph R Stenger MD
4420 NE 36th Ave.
Portland OR 97211

2559-1 22. General Opposition
2559-2 10. LCA Calculations
2559-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Joseph Stenger
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, November 12, 2018 8:51:18 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

As a grandparent, I could not be more worried about the drastic climate changes we are already seeing. As one small example, the fires in CA are out of control- and this is in November! The terrible consequences of climate chaos are upon us and worsening rapidly.

I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. We now all understand that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources. This needs to happen in the next decade, not in the distant future. The health and very lives of our children and grandchildren depend on making the right decisions now.

The draft SEIS does not account for the full climate impacts of fracked gas. This is unacceptable and must be corrected before you decide on a permit.

A significant concern with this draft SEIS is that it is incomplete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I respectfully request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

There are several issues with the current draft report you issued on October 8th. It is my belief that when these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane.
-It uses the UN 2007 value for GWP of 25 for the 100-year value, where you should be using the 2016 value of 32. This single modification in the modeling of GHG emissions makes the proposed plant dirtier to our air and climate than if the LNG plant is not built.
-Methane is much more potent in the short-run, but the SEIS analysis only looks at the long-term impact.
-It uses the 100-year GWP of methane and not the 20-year value which is much more relevant

given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
-If later studies show that actual leaks are much greater, what will happen? Will the facility stop operations until the data from new studies are calculated?
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice. Even in PSE's own GHG life cycle analysis, the external peer reviewer raised the issue of inaccurate slippage assumptions. PSE should use the higher rate that is considered best practice.
-At public information meetings in 2017, the Air Agency stated that the facility would release ammonia, arsenic, cadmium, sulfur dioxide, and hydrogen sulfide. These contributions to air pollution, in any amount, degrade air quality. Furthermore, the proposed vaporizer unit would release VOCs. The health of surrounding communities will be adversely impacted. This is not acceptable.
-The proposed project is an assault on the Puyallup Tribe's rights and community health.

For all these reasons and more, I urge and implore you to consider the negative effects of this proposed plant. We need to pivot rapidly to use of safer renewable energy and widespread efforts to reduce energy use through conservation programs of all types. You have an important role to play now. Future generations depend on our wise decisions.

Thanks again for initiating this crucially important review of this facility and I hope that you will take the best available science into consideration when revising this draft SEIS.

Joseph Stenger
joseph.stenger@gmail.com
4420 NE 36th Ave
Portland, Oregon 97211

2559-3 cont'd 12. LCA Inputs and Assumptions - Global Warming Potential Value
2559-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2559-5 19. LCA Inputs and Assumptions - End Use
2559-6 14. LCA Inputs and Assumptions - Leakage/Slippage
2559-7 13. LCA Inputs and Assumptions - Natural Gas Source
2559-8 14. LCA Inputs and Assumptions - Leakage/Slippage
2559-9 21. LCA Inputs and Assumptions - Additional Air Pollutants
2559-10 5. Regulatory Framework
2559-11 22. General Opposition

1457-1 22. General Opposition

From: Marilyn Stewart
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 3:39:28 PM

Name: Marilyn Stewart
Email: Mstewart@windermere.com
Address: 1397 Tyler creek -
Ashland, Oregon 97520

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We need to be working towards clean energy not fracking not oil and gas we need wind and solar please don't put our area in harm's way

1497-1 22. General Opposition

From: Peter Stewart
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:18 PM

Name: Peter Stewart
Email: Pepelepete@gmail.com
Address: 3945 SE 52ND ave -
Portland, Oregon 97206

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I have personally stood by the Pullyalup tribe on this opposition to the LNG project.
We feel the project has not utilized any channels of communication for permitting, public safety, or right to build. This build breaks laws on the land it is founded.
I object the continuation of this storage facility and request denial of Any further analysis.
Safety for surrounding Puget Sound residence is in jeopardy with this gas facility. With rising water levels that scientists are predicting, and potential meltdown of this enormous facility it's not safe.

0358-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Shakira Stewart

Address or email Shakiras@uw.edu

At first, Maybe you listened. But does anyone in the Agency actually care about what Tacoma has to say? Do the paid representatives give a fraction of a damn? The representatives talked to eachother ~~should~~ were trying to ~~need~~ communicate with eachother on paper, got up and walked around, and made faces at eachother all during speeches. I feel like a lot of people have things to say in opposition, and "The Agency" has chosen not to care. ~~No~~ It's FREE to care. ~~Re~~ Clean air is a right - NOT a commodity. To exploit Greedy sickos. Look where the people are - ~~concerned~~ concerned Mothers and families - who had to do homework to keep up with "The Agency's" scheme. I will NOT listen to paid men in suits with pre-written ~~speech~~ Propaganda.

2543-1 22. General Opposition
2543-2 3. Outside of SEIS Scope
2543-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2543-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2543-5 7. SEPA Alternatives
2543-6 7. SEPA Alternatives

From: verastewart1@everyactioncustom.com on behalf of Vera Stewart
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Tuesday, October 23, 2018 9:21:52 AM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels. It is disappointing to know that this huge structure may be built to store fracked natural gas. This is another example of what is happening to cause climate change. In addition, natural gas is dangerous in that it can
easily explode causing a wide range of damage including killing people. A safer method such as wind and solar definately should be studied more. We seem to presently be witnessing more climate change affects this year and it is concerning.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Vera Stewart
Dallas, TX 75230
verastewart1@yahoo.com

Steve: Okay. Jeffrey Grinstead? Jeffrey Grinstead? Okay.

[03:44:00] Karen Stocker?

Karen: I'm Karen Stocker. I'm grateful to live where there are water protectors and brilliant children and scientists. And I was so touched to hear the Tacoma citizens. And I feel the Tacoma citizens, the maritime workers, and the sailors, the union workers, you could give them green jobs. They would do great with that. I wanted to talk to you about wisdom and vision because I feel for the position of people who have to make this kind of decision. Wisdom, the long view, the deep view, the broad view. So, I thought I would sing to you.

[Singing] Oh where are our great leaders? Our wise visionary leaders? Awaken our noble leaders, now stand with your people and with our earth. Oh where are our great leaders? Our wise and noble leaders? Oh hear us courageous leaders now stand with your people and our earth.

[03:45:00]

Steve: Thank you.

2558-1 22. General Opposition
2558-2 10. LCA Calculations
2558-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2558-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2558-5 19. LCA Inputs and Assumptions - End Use
2558-6 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Tobi Stone
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Monday, November 12, 2018 11:08:13 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you so much for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate changing so drastically, as urgently stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project are extremely necessary. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's incomplete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

-SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.

- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?

- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.

- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements

taken in the field have shown that leakage rates are much much worse.

-What assurances do we have that all of the fracked gas would come from BC? The claim is that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, natural gas was used from from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).

- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

-There are questionable Methane Slippage Rates for TOTE Vessels – It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Analysis assumes credit for extra maritime customers that currently do not exist – The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Sincerely,
Tobi

Tobi Stone
tobiastone@gmail.com
9518 S 200th St.
Kent, Washington 98031

2558-6 cont'd 14. LCA Inputs and Assumptions - Leakage/Slippage
2558-7 13. LCA Inputs and Assumptions - Natural Gas Source
2558-8 14. LCA Inputs and Assumptions - Leakage/Slippage
2558-9 14. LCA Inputs and Assumptions - Leakage/Slippage
2558-10 16. LCA Inputs and Assumptions - Hydraulic Fracturing
2558-11 19. LCA Inputs and Assumptions - End Use

From: lstoning@everyactioncustom.com on behalf of Louise Stonington
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Thursday, November 1, 2018 4:20:22 PM

Dear Puget Sound Clean Air Agency,

Liquid natural gas is not a better choice than oil for the climate.
Natural gas is said to be clean, but this is misleading. When natural gas burns, it releases 55% as much carbon dioxide as burning coal and 80% as much carbon dioxide as burning gasoline. Natural gas is about 95% methane, which is much more warming than carbon dioxide. Even if leakage could be kept to 3%, the effect of natural gas use on the climate would be worse than the use of oil or coal and even worse than that, counting the additional energy needed to compress and store natural gas, Since 2006, methane emissions have been rising significantly, correlating with the increase in fracking.
With the speed of development of batteries, solar electricity and other alternative clean energy, the money invested in an LNG plant may not prove profitable. General Electric just announced a $23 billion decrease in value because of their investment in natural gas turbines which proved non-competitive against clean energy.
It is our moral responsibility to drastically cut carbon emissions . Thank you.

Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

2569-1 22. General Opposition
2569-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2569-3 13. LCA Inputs and Assumptions - Natural Gas Source
2569-4 7. SEPA Alternatives
2569-5 19. LCA Inputs and Assumptions - End Use
2569-6 10. LCA Calculations
2569-7 22. General Opposition

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Ms. Louise Stonington
1922 15th Ave E Seattle, WA 98112-2829

2226-1 22. General Opposition

From: Trinda Storey
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Friday, November 9, 2018 12:02:03 PM

Puget Sound Clean Air Agency,

The long will further climate change. This is inhumane

Trinda Storey
Trinda9843@gmail.com
4742 NE 16TH AVE
SEATTLE, Washington 98105

From: Steve
To: storms123@aol.com; Public Comment
Subject: Comments about PSE"s proposed LNG plant
Date: Wednesday, November 21, 2018 5:03:53 PM
Attachments: Dear PSCAANov 21 V3.docx

Attached are some additional comments about the proposed LNG plant.

Steven Storms

0976-1 17. LCA Inputs and Assumptions - Peak Shaving
0976-2 3. Outside of SEIS Scope
0976-3 3. Outside of SEIS Scope

Dear PSCAA Nov 21, 2018

I would like to make additional comments about the DEIS for the LNG plant being constructed by PSE in Tacoma.

After a thorough review and several other letters, I felt that several more comments were necessary.

While the DSEIS was suppose to contain information about the air emissions, PSE also included much more. Specifically, they changed the description to make the project more economically feasible for them. Additional trucking, additional barging and additional capacity were all added without review. The need for peak shaving was redefined. The original spiel told the public that the peak shaving was needed to protect the natural gas consumers from low gas pressure in the consumer's lines due to large usage during cold winters. Now the story has changed to, peak shaving is required to run gas turbines to generate more electricity on cold days. It appears the customers for the peak shaving has changed from gas customers to electric customers. If this is the case, their need for peak shaving will be invalid. They do not need extra gas capacity during the several coldest winter days, they need extra electrical capacity. Any claim that LNG was cheaper than building new pipelines should be voided because there has been no claim of a need for extra electrical lines. Until it is proven that the requirement for electrical demand can not be met with additional purchased electricity, all their claims are void. The need for the public to spend $133 million of the $310 million for plant would be improper. The need for the gas customers to spend any capital to build a plant that will support the electrical customers of PSE is probably illegal.

The equally bad side of the economics is that PSE is now trying to proposing building a 500,000 gallon plant instead of the 250,000 gallons originally proposed. I do not know if they plan on increasing the cost of the plant while doubling the capacity, but I would imagine that the percentage of the cost of the plant the public will be required to pay will not change.

While PSCAA should be looking at the air emissions, these changes in the economics can not be ignored or allowed. This DSEIS will only get your review and it will be upon you to determine if the entirety has changed sufficiently to warrant not approving it. It appears that they have tried to put in too many changes that the original FEIS is no longer valid and the new DSEIS can not be approved.

Thanks for your consideration.

Steven Storms

BSChE, PE (retired)

1096-1 1. Determination of SEIS Scope - Comparison to FEIS
1096-2 3. Outside of SEIS Scope
1096-3 1. Determination of SEIS Scope - Comparison to FEIS
1096-4 3. Outside of SEIS Scope

From: Steve
To: Public Comment
Subject: Additional comments on PSE LNG DSEIS
Date: Monday, November 19, 2018 8:02:42 AM
Attachments: Dear PSCAANov 19 V2.docx

Dear PSCAA Nov 19, 2018

I would like to make some additional comments about the DSEIS performed on the proposed LNG being built by PSE in Tacoma.

I very much appreciate the efforts of PSCAA to investigate the emissions created by both the upstream and downstream sources. I submitted many requests to the City of Tacoma stating that it had been ignored and was required by law. It is obvious when these impacts are included, the emissions become much worse.

I understand that your agency is primarily involved with the air emissions and that the Supplemental EIS that you required would analyze the “air emissions”. You are put in a difficult position due to the fact that the DSEIS rewrote the definition of the project and included additional elements that were not in the original FEIS.

First, this SEIS should not allow any changes because it is only a supplemental review of the air emissions described in the FEIS. Additional capacity, additional trucking, additional barging, etc. are not part of the original FEIS.

Second, the changes/additions to the SEIS have many more implications besides the air emissions. For example, all the safety analysis was done on a 250,000 ton per day basis. If the new SEIS wants to assume a 500,000 ton per day capacity, a completely new safety analysis would be required. This was not included in the SEIS and I do not think PSCAA would be the proper agency to review it.

The same could be said for the economics section that is required in any EIS. The SEIS described a larger capacity plant that had more trucks, more barging and more customers. The SEIS makes assumptions about potential new customers that are currently non-existent. These kinds of added assumptions would be hard for any agency to evaluate. This is also something that PSCAA is not designed to deal with.

Overall, I find it easy to reject the SEIS on the increased air emissions. There are several very obvious errors that prove that the SEIS is wrong. (The misuse of the British Columbia methane leakage rate, the 100 year timeframe for greenhouse gas equivalents and many others that I submitted in my previous letter.)

Neglecting the air emission portion, the SEIS should be completely rejected due to the additions and changes to the FEIS that can not be substantiated. If these are actual changes that PSE wants to include at this late date, it would require a completely new EIS so that all the implications could be evaluated. It is unlawful to put all these new issues in the FEIS that is only being done to look at the upstream and downstream air emissions. The safety and economic areas that are being impacted should require analysis by the appropriate agencies.

It appears the only three choices that I could see being made;

-[if !supportLists]-->1. 1. <!--[endif]-->Reject the whole SEIS due to the large increases in GHG calculated by using the correct BC methane leakage rate and the 20 year GWP instead of the 100 year.

-[if !supportLists]-->2. 2. <!--[endif]-->Have the SEIS redone using only the project description approved in the FEIS and not all the additions that were made in the SEIS. It would be a clean assessment appropriate for the PSCAA request to include the upstream and downstream emissions.

-[if !supportLists]-->3. 3. <!--[endif]-->Reject the whole SEIS on the grounds that the changes in capacity,

distribution and customers were significant enough to require a complete analysis. This would include new safety studies, new economic studies and impacts on the community.

I can not see any scenario that this SEIS can be approved. The flaws, additions and the omissions are too great to make it acceptable.

Thank you for your attention to this very serious matter. I hope you agree with my analysis.

Steven Storms
BSChE, PE (retired)
storms123@aol.com

Dear PSCAA Nov 19, 2018

I would like to make some additional comments about the DSEIS performed on the proposed LNG being built by PSE in Tacoma.

I very much appreciate the efforts of PSCAA to investigate the emissions created by both the upstream and downstream sources. I submitted many requests to the City of Tacoma stating that it had been ignored and was required by law. It is obvious when these impacts are included, the emissions become much worse.

I understand that your agency is primarily involved with the air emissions and that the Supplemental EIS that you required would analyze the “air emissions”. You are put in a difficult position due to the fact that the DSEIS rewrote the definition of the project and included additional elements that were not in the original FEIS.

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Second, the changes/additions to the SEIS have many more implications besides the air emissions. For example, all the safety analysis was done on a 250,000 ton per day basis. If the new SEIS wants to assume a 500,000 ton per day capacity, a completely new safety analysis would be required. This was not included in the SEIS and I do not think PSCAA would be the proper agency to review it.

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Neglecting the air emission portion, the SEIS should be completely rejected due to the additions and changes to the FEIS that can not be substantiated. If these are actual changes that PSE wants to include at this late date, it would require a completely new EIS so that all the implications could be evaluated. It is unlawful to put all these new issues in the FEIS that is only being done to look at the upstream and downstream air emissions. The safety and economic areas that are being impacted should require analysis by the appropriate agencies.

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1. Reject the whole SEIS due to the large increases in GHG calculated by using the correct BC methane leakage rate and the 20 year GWP instead of the 100 year.
2. Have the SEIS redone using only the project description approved in the FEIS and not all the additions that were made in the SEIS. It would be a clean assessment appropriate for the PSCAA request to include the upstream and downstream emissions.
3. Reject the whole SEIS on the grounds that the changes in capacity, distribution and customers were significant enough to require a complete analysis. This would include new safety studies, new economic studies and impacts on the community.

I can not see any scenario that this SEIS can be approved. The flaws, additions and the omissions are too great to make it acceptable.

Thank you for your attention to this very serious matter. I hope you agree with my analysis.

Steven Storms

BSChE, PE (retired)

storms123@aol.com

From: Steve
To: Public Comment
Subject: Comments on LNG SEIS
Date: Monday, November 19, 2018 12:09:15 AM
Attachments: Dear PSCAA LNG Comments Nov 15.docx

Attached are my comments about the inadequacies of the DSEIS done for the Tacoma LNG plant being proposed by PSE.

Please take them into consideration. The DSEIS is fatally flawed and should not be approved.

Thanks

Steven Storms

1097-1 13. LCA Inputs and Assumptions - Natural Gas Source
1097-2 1. Determination of SEIS Scope - Comparison to FEIS

Dear PSCAA Nov 15, 2018

I am writing in response to the recent Draft SEIS done for the LNG plant being proposed by Puget Sound Energy in Tacoma. I am a retired Chemical Engineer and PE with over 40 years experience in the energy and environmental field. I was totally dismayed at the biased DSEIS report that was just published. To me, it was intuitively obvious that an unbiased SEIS would conclude that LNG produced from fracking wells has a very detrimental impact on Greenhouse Gas emissions. This is be both locally and globally. The warped logic and the outdated assumptions make the DSEIS a total farce. It appears that the company that wrote the DSEIS tried to figure out some possible way to make assumptions that would lead to the conclusion that LNG was beneficial. I find their whole report erroneous, with the intent to mislead the public and your agency. I know this is harsh criticism, but it is my firm belief, backed by over 40 years experience.

Let me now explain my reasoning.

1. As the DSEIS states several times, the only reason they can conclude LNG can lower CO2 emissions is due to the extremely low methane fracking emissions achieved in British Columbia. If the natural gas were to be supplied from anywhere else, the emissions would be so high that it would reverse their conclusion. -- Newsflash!!! The assumption that British Columbia has lower methane leakage rates has been dispelled for several years. In fact there was a big scandal because the government withheld the information for 4 year until a journalist discovered the cover up. The new results show the BC methane leakage rate is at least 2.5 times higher than previously reported.
https://cleantechnica.com/2017/05/16/british-columbia-albertas-methane-emissions-drastically-reported/?fbclid=IwAR02CI8XEl30ChIov9W59xTgmGMSu5TMolz1tVDUnkA4nHgY5hw1zGXG4H4
https://thenarwhal.ca/unreported-emissions-natural-gas-blows-british-columbia-s-climate-action-plan-bc-s-carbon-footprint-likely-25-greater
https://thenarwhal.ca/b-c-coughs-up-fracking-report-four-years-late-only-after-leaked-journalist

Even the use of natural gas coming exclusively from British Columbia is questionable and is a new assertion that was not in the original FEIS. Originally it was reported in the FEIS as coming from Alberta, British Columbia and the Rocky Mountain States.

3.11.3.8 Natural Gas Natural gas service is provided by PSE in the vicinity of the Project. PSE is Washington State's oldest energy company and provides natural gas services to approximately 770,000 natural gas customers across six counties, including Pierce County (PSE 2014b). The City of Tacoma, City of Fife, and unincorporated Pierce County are located within PSE's Pierce County service area. PSE's natural gas supply is delivered to Washington via interstate transmission pipelines owned and operated by third parties, and the natural gas is provided by suppliers in Alberta, British Columbia, and the Rocky Mountain states. The natural gas supply conveyed through to PSE is then distributed to customers through approximately 21,000 miles of PSE-owned gas distribution mains and service lines (PSE 2015).

1097-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1097-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
1097-5 12. LCA Inputs and Assumptions - Global Warming Potential Value

2. While the use of 100-year Global Warming Potential (GWP) is probably the most common measurement, the 20-year measurement also has a lot of merit. Even the International Panel on Climate Change (IPCC) says that there is no scientific argument for selecting 100 years compared to other choices. The choice of time horizon is a value judgement. With the new United Nations report, it is clear that drastic climate change is much closer to the 20 year time frame than the 100 year. My value judgement would lean much closer to the 20 year time frame and should be used. If the 100 year measurement is mentioned, it should only be used as a comparison.

I think Drew Shindell of NASA said it best at the Goddard Institute for Space Studies: "If you believe limiting near-term climate change is an important goal for society, then it makes sense to pay attention to the 20-yr value (105X)."

https://thinkprogress.org/how-the-epa-and-new-york-times-are-getting-methane-all-wrong-eba3397ce9e5/
The brand new IPCC report agrees that the "Planet has only until 2030 to stem catastrophic climate change". It will be well past the ability to influence climate change in 100 years.
https://edition.cnn.com/2018/10/07/world/climate-change-new-ipcc-report-wxc/index.html

3. The SEIS should show the impact of the LNG project on the environment. The project has a 25 year lease with the option for an additional 25 years. To make the correct analysis of the impact, it would seem obvious that one or both of these contract lengths should be used. While I believe that the 20 year GWP is the correct assumption, it is clear that using the 100 year assumption has no possible relevancy. Any analysis beyond the contract length of 25 or even 50 years would be pure fantasy. (A 20 - 40 year timeframe is also mentioned.)

4. If the report is going to rely on the 100-year GWP at least they should get it right by using the most current number. The Fifth Assessment from the IPCC claims a 34 GWP for methane instead of the 30 or 25 used in the SEIS. (It appears possible that the SEIS is actually using 25 as the GWP, which is about 5 years outdated.) This would be a 36% increase and this alone is sufficient to change the SEIS conclusion.
From the EPA,the GWP for methane is between 28 -36.

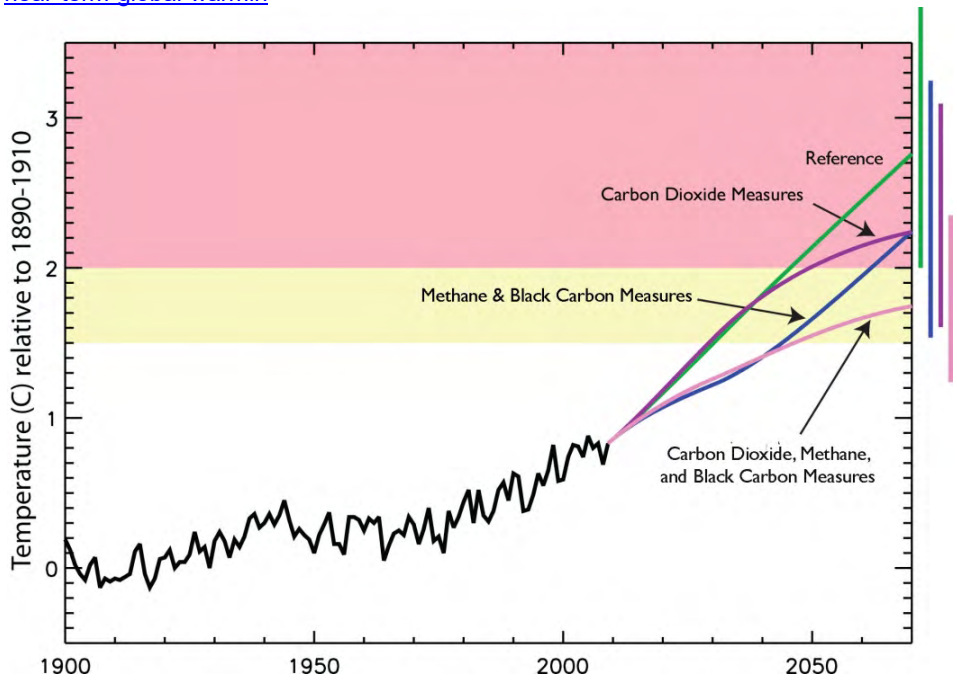
https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

Are there alternatives to the 100-year GWP for comparing GHGs?
"The United States primarily uses the 100-year GWP as a measure of the relative impact of different GHGs. However, the scientific community has developed a number of other metrics that could be used for comparing one GHG to another. These metrics may differ based on timeframe, the climate endpoint measured, or the method of calculation.
For example, the 20-year GWP is sometimes used as an alternative to the 100-year GWP. Just like the 100-year GWP is based on the energy absorbed by a gas over 100 years, the 20-year GWP is based on the energy absorbed over 20 years. This 20-year GWP prioritizes gases with

1097-6 3. Outside of SEIS Scope
1097-7 1. Determination of SEIS Scope - Comparison to FEIS

shorter lifetimes, because it does not consider impacts that happen more than 20 years after the emissions occur. Because all GWPs are calculated relative to CO2, GWPs based on a shorter timeframe will be larger for gases with lifetimes shorter than that of CO2, and smaller for gases with lifetimes longer than CO2. For example, for CH4, which has a short lifetime, the 100-year GWP of 28–36 is much less than the 20-year GWP of 84–87."

5. In order to prevent either the 1.5 or 2.0 degree C temperature rise described in both the Paris Climate Accord and the UN study, methane plays a crucial part. In this NASA graph it shows the only way to meet the temperature targets is by reducing methane emissions. All other methods will exceed the targets. It does not take much forethought to realize that replacing one fossil fuel with another will have very little impact on CO2 emissions. http://www.climatecentral.org/news/groundbreaking-new-study-shows-how-to-reduce-near-term-global-warmin



6. While the City of Tacoma did not think a SEIS was warranted, they tried to make clarifications through the use of the "Frequently Asked Questions". This FAQ process addressed many of the concerns brought up by the public. Often the city had to go to PSE to get a firm answer. This method did not always seem appropriate to handle questions, but it was the way the City chose in order to keep from requiring a Supplemental EIS. The response from the FAQs should

1097-8 1. Determination of SEIS Scope - Comparison to FEIS
1097-9 1. Determination of SEIS Scope - Comparison to FEIS
1097-10 1. Determination of SEIS Scope - Comparison to FEIS

therefore be taken as an extension of the FEIS. That is also where the new DSEIS differs drastically from the claims made by the City in the FAQ section. Either the City is wrong or the new SEIS is drastically different than what the City approved and presented to the public.

7. When looking back at the Frequently Asked Questions (FAQ) in July listed in the City of Tacoma website, it is obvious that the scope of the LNG project has been changed in the DSEIS.

"Can the Project Change Without Additional Review?

The FEIS analyzed a defined scope of the project as proposed by Puget Sound Energy, which has been carried through to the Shoreline Substantial Development permit and other permits:

- One loading arm and platform to serve only the TOTE vessels in the Blair Waterway;
- Stormwater infrastructure and pier surface removal in the Hylebos Waterway;
- Construction of the LNG liquefaction facility;
- Extension of a natural gas pipeline to the site; and
- Distribution of product using up to two tanker trucks per day.

When Puget Sound Energy submits a building permit it will be reviewed for consistency with the proposed project in the FEIS. If anything beyond that scope is proposed or there are substantive changes to the project that are likely to have significant adverse environmental impacts, additional review will be required to determine if the changes, and the likely impacts therefrom, are significant. For example, serving additional vessels in either the Blair or the Hylebos Waterway will require additional infrastructure in the shoreline, since that part of the project, as originally proposed, has now been removed. This will require a new shoreline permit (with a public notice and review process) and concurrent environmental review."

http://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=113653

All new mentions of additional barging, additional trucking and even the thought of increasing the capacity from 250,000 gallons of LNG per day to 500,000 gallons has been illegally added. Either the City of Tacoma did not understand what they approved or PSE misrepresented the project.

Let me point out several changes from the FEIS or misunderstandings that the City of Tacoma made.

A. Plant capacity that is being permitted.

In the FAQ section, the question was asked about the plant capacity. This was due the uncertainty raised by the range in the FEIS spanning from 250,000 gallons to 500,000 gallons. This is the reply from the City.

- "What Production Thresholds Were Used in the Air Quality Analysis?

In several places in the FEIS, the daily production capacity of the LNG plant is listed as a range of 250,000 – 500,000 gallons per day. The question has been asked about which production level was used to generate the emissions analysis in the air quality impacts section of the FEIS. PSE has confirmed that the production limit of the plant as currently designed is 250,000 gallons per day; the plant is not capable of producing more LNG daily than that.

Any increase in production would require an expansion of the plant, which would require additional permitting and applicable environmental review. A 500,000-gallon production capacity would be predicated on additional customers, which would also have additional infrastructure needs and/or trip generation with additional review and permitting."

The part about "With additional review and permitting" seems to be absent in the new DSEIS because it was added with no additional review or permitting.

B. Trucking

While the new SEIS talks about trucking to haul LNG to other customers, in the FAQ from the city, it is quite clear that is not intended.

- What About Trucking?

1097-11 1. Determination of SEIS Scope - Comparison to FEIS
1097-12 1. Determination of SEIS Scope - Comparison to FEIS

The PSE site is located on the east side of Alexander, bordering the Hylebos Waterway. The EIS analyzed the environmental impacts of the facility. This includes an LNG storage tank, the liquefaction facility (refrigerants propane, isopentane, and ethylene), the cryogenic pipeline and loading facility for TOTE, and two truck loading bays on the west side of the facility.

Under the project as proposed, up to two tanker trucks per day would arrive empty at the Tacoma LNG Facility and leave carrying LNG to market, generally to a local user. These would service the existing peak-shaving facility in Gig Harbor, as well as other users. PSE has indicated no intent to increase trucking beyond the two trips a day analyzed in the FEIS; should trucking increase, the City would analyze the proposed increase to determine whether it requires additional review."

Again, additional trucking was added in the SEIS, which is above the two tanker truck trips per day the city claimed. This was done without any additional review by the City. If PSE wants to add new elements to the project, it should not be done during a SEIS. A totally new review of the project would be required and a completely new EIS should be required.

C. Barging

The question about additional barging has been a consistent problem. Originally, the PSE plan included a barging site on the Hylebos Waterway. When this was removed, it was stated that no additional barging would be permitted to replace the Hylebos capacity. In the FAQ section from the City, this issue was addressed several times.

- "Will the excess LNG be sold to other ships via bunker barges and ships?

According to PSE, LNG production will be dependent on market demand so LNG production would be limited to what is needed to meet TOTE's needs, trucking, and storage for natural gas peaking requirements. There are no proposals at this time to sell LNG to other ships via bunker barges, which would require additional permitting and public review."

- Outline operations at the Blair Pier. Will LNG be barged in addition to TOTE bunkering?

PSE has not advised the City of any changes to the proposed operations at the Blair Terminal as described in the FEIS Section 2.2.2 TOTE Marine Vessel LNG Fueling System. Barging LNG from the proposed new dock on the Hybelos Waterway was withdrawn from the Shoreline permit, no additional barging has been proposed by PSE."

- "What About Bunkering?

There has been some confusion caused by the term "bunkering" as it has been used in multiple contexts. The term "bunkering" applies in general to ship fueling whether from land during berthing or from water by barge. The term applies in general to any ship fueling at a dock (including TOTE ships), but is also used to describe barges which would fill and then go to another site to fuel ships (as in bunkering barges).

Bunkering from land can include fuel trucks or fixed bunkering facilities such as proposed by PSE. Bunkering from water can be done by barge or in some cases bunkering ships for refueling at sea.

The proposed dock on the Hybelos to load LNG barges was not intended for bunkering barges to be used by TOTE Marine. If the dock was constructed the purpose would be to load barges intended to deliver LNG to other customers in Puget Sound. However, after the EIS process was completed, PSE stipulated to withdraw the construction of a LNG barge dock on the Hybelos from the shoreline permit. There is no proposal to relocate bunkering of LNG barges to the Blair Waterway. Such a proposal would require additional environmental analysis under SEPA.

Further, there appears to have been some confusion regarding the use of the term "bunkering" in relation to recent conveyances of easements leading to a misunderstanding about PSE's ability to move elements of the project previously proposed on the Hylebos Waterway to the Blair.

Despite the language of the easement, such a relocation is not allowed under the shoreline permit. Any relocation would involve additional shoreline permitting, environmental assessment, and public review.

The FEIS analyzed two bunkering barges calling in the Hylebos. Relocation to the Blair might benefit from analysis of impacts due to the move, or any other change in impacts from the relocation, but no such relocation is taking place.

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1097-13 1. Determination of SEIS Scope - Comparison to FEIS
1097-14 1. Determination of SEIS Scope - Comparison to FEIS
1097-15 8. No Action Alternative

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The FEIS analyzed two bunkering barges calling in the Hylebos. Relocation to the Blair might benefit from analysis of impacts due to the move, or any other change in impacts from the relocation, but no such relocation is taking place.

The addition of potential new barging, bunkering and relocating elements from the Hylebos to the Blair now seems to be the intention of PSE. According to the City, none of this would be allowed. I have underlined several of the specific statements made by the City. In no uncertain terms would any of this be allowed! Even the shoreline permitting would become invalid. Further assessment and public review are required to make these changes. How the writers could include these changes could only be at the insistence of PSE. I am sure the public, the City or even PSCAA would not have tried to make these huge changes.

Despite the assurances from the City of Tacoma, the new SEIS has added all three elements (Capacity increases, trucking and barging). Under Section 1.2 and 1.2.1 of the new DSEIS, it clearly states that the 250,000 gallons per day up to 500,000 gallons is still being proposed. It also says that bunkering barges and trucks will be used to provide fuel to other customers. This appears to be a blatant attempt to expand the project in the SEIS process without going through the permitting process. It does not appear to be as stated by the City,

- "What Changes have been made to Intended LNG Distribution Methods and Volumes?

The FEIS examined distribution to TOTE via pipeline, a pipeline to new pier on the Hybelos for LNG barges, and a LNG truck loading rack. The only change occurred when, during the Shoreline Permit appeal process, PSE withdrew the proposal to construct a new pier on the Hybelos Waterway for LNG barges. The production of LNG can be scaled up or down depending on market demand so volumes may vary, but generally would be limited to what is required by TOTE, independent trucking to end users, and maintaining storage volumes."

Nowhere does it say that additional barging would be allowed or that more than two trucks of LNG would be allowed. The City gave assurances that only 250,000 gallons would be permitted. Now the DSEIS has tried to increase all of them. This is not a SEIS of the original project, but a completely new attempt to rewrite the FEIS to give PSE more capacity and expand the transportation abilities.

8. The DSEIS seems to include new information and options. For instance, both barging and trucking options were added that were not included in the original FEIS. While I thought that new options were not going to be included, but if they are, I would like to add one more. The base case has changed since the FEIS was completed. Originally, the TOTE ships were burning normal diesel fuel. Currently they are burning low sulfur fuel to meet the new shipping emission regulations. This appears to be a solution that is readily available and is already in use. There is not a drastic need for conversion to LNG to meet emission limits. This should be the new base case.

1097-16 19. LCA Inputs and Assumptions - End Use
1097-17 19. LCA Inputs and Assumptions - End Use
1097-18 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1097-19 22. General Opposition

9. As a matter of curiosity, I would like to know about the dual fuel capability that the TOTE ships will maintain. They plan on converting to LNG, but will keep the ability and fuel on-board to switch back to diesel if there are problems with the LNG or they need extra power. If they think this is needed so bad as to add the extra weight and take up extra cargo space, they must plan on needing to use it on some occasions. If they do spent a portion of the time burning diesel fuel, even if it is in foreign waters outside the area required to meet the new emissions regulations, the CO2 and other emissions from the diesel should be included in the review.

10. Concerning the new options that were added to the SEIS, they should be stricken from the evaluation. Trying to take credit for new users that are not permitted in the FEIS is a slight of hand method to find reductions on CO2 emissions. In the very first draft, PSE intended to add a barging facility on the Hylebos Waterway. Due to environmental and tribal problems, this facility was deleted from the project. This left PSE with a large problem. About 40 % of the total plant production had no customers or no way of being shipped or transported. To make matters worse, the Washington State Ferry System, which had been considering conversion to LNG decided to convert to electrical engines instead. Many attempts were made to discover what PSE planned on doing with the excess capacity. At first they said they would run the plant according to demand. Further discussions with the City specified that barging from the Blair Waterway was not allowed because there was no permit and that barges could not mate up to the loading system anyway. Questions were raised about potential increases in trucking. Even though, the facility had the capacity to load nearly 100 tanker trucks a day, the FEIS stated that only two trucks would be used. Now in the SEIS, both barging and tanker trucks have been added. These new additions or imaginary additions are a big reason that they can claim reductions in CO2. PSE has never shown they have any customers for the excess LNG. Without specific customers, it is impossible to calculate the CO2 emissions. Even worse, they are now trying to add the capability to transport the excess LNG if they find customers. This capability was not included in the FEIS and was flatly denied by the City and PSE when questioned about it. This is both an expansion of the FEIS and an attempt to take credit for emission reductions from phantom users.

11. In the DSEIS, a lot of credit was taken for imaginary trucking use of LNG. There are currently no customers for this LNG, there is no permit for the loading of this fuel and the assumption of increasing the capacity to 500,000 gallons per day is not allowed. These assumptions warped the benefits of LNG. -- While all the benefits of extra LNG trucking usage in Tacoma were exaggerated, somehow the detrimental impact of trucking at the fracking well sites were omitted. Each fracking well requires massive amounts of water, chemicals and sand. Large amounts of waste must also be hauled away from each site. Most of this will be delivered by trucks burning diesel and emitting large amounts of CO2. These emissions are real and not based upon assumptions that future customers for LNG might be found that will want to convert to LNG. During the life-cycle of the LNG plant, the number or fracking wells required to supply the plant will reach into the thousands. Each well will require a fleet of trucks and many other associated pieces of equipment to provide the natural gas going to the LNG plant in Tacoma. Much of this will be trucking, but pumping, drilling and a myriad of other activities will

1097-20 22. General Opposition
1097-21 7. SEPA Alternatives

be required. These must all be included in the DSEIS. Allowing PSE to cherry-pick just the potential of future LNG users in Tacoma leads to a very erroneous conclusion. Again, they are falling back into the previous methodology of not including all the upstream impacts. This caused the SEIS to be required the first time, but they seem to want to repeat it again.
http://www.otsego2000.org/documents/FrackingShaleTrucks.pdf
http://www.bctwa.org/Frk-HowManyTankerTrucks.pdf
https://www.fractracker.org/2018/10/living-with-silica-sand-mines/?fbclid=IwAR2yeIu0KblKMHB1pKerHJNhD_7pUkRK_ycFUcuit9VncAc1U1tDzjiT_N0

Overall, this DSEIS attempt to get the LNG approved has completely failed as a legitimate document. It has used outdated assumptions, twisted logic, incomplete data and pure manipulation in order to show that the use of LNG is beneficial. It has expanded the capacity to make it possible to double the production capacity of the plant without requiring a further review or permitting. It has added additional transportation capability in order to use the extra production capacity. It failed to include upstream impacts such as the trucking and equipment required to operate the fracking wells. (Note: This is just a continuation of the problem of the previous FEIS that failed to include upstream impacts.) It then tries to justify the increased capacity as being more beneficial than the lower 250,000 gallon capacity. If the truth were known, I doubt that PSE even has the customers that are required to make that calculation. As new technology improves, PSE may find it harder to find customers, much like the ferry system that decided to convert to electricity. It is entirely possible that they may be thinking about expanding their production for export, which seems to be one of the few true legitimate customers in the future. Florida is currently experiencing this type of problem. https://www.desmogblog.com/2018/10/04/lng-by-rail-small-scale-exports-florida-edens-fortress?fbclid=IwAR3gBE-zDWqlWbr35D_MRES3GIJKXU9zRYKbvDirE6F8BckTR5JHGIXFEts

No matter what PSE plans to do with the current extra capacity at the 250,000 gallon rate or the expanded 500,000 gallon rate, it is a bad product, being built in a bad location. It can not improve the air quality in Tacoma because the ships are not even running while in Port. All the emissions from the LNG plant will be incremental, and it will run 24 hours a day every day of the year. I generally feel that expansions of any type of fossil fuel is damaging, especially when one fossil fuel is replacing another. TOTE has other options, including the one they are currently using. The TARGA plant adjacent to TOTE also has biofuel available to meet the regulations. There is not another shipping line or single ship in Tacoma or Seattle that is choosing the LNG option. Low sulfur fuel or scrubbers seem to be the preferred method of everyone else.

Please take the information that I have provide into account when you are evaluating the DSEIS. I think that you will find that the whole attempt to be a guise to permit something that is clearly wrong. It is a thinly veiled attempt to make LNG appear to be beneficial. It completely ignores the assurances made by the City of Tacoma in the FAQ section. It makes an attempt to add additional capacity and increase operating options that were not even in the FEIS. It still fails to

include all the upstream impacts. You should be able to see through the multitude of misrepresentations and reject the whole report.

Thank you for your consideration.

Steven Storms
BSChE, PE, (retired)
storms123@aol.com
253 202-9925

1807-1 5. Regulatory Framework

From: Steven Storms
To: Todd Hay
Cc: Public Comment; Janna Stewart; Nanette Reetz; Twylia Westling
Subject: Re: Comment Regarding PSE LNG GHG SEIS
Date: Wednesday, November 21, 2018 3:54:46 AM

I wanted to make this is shared with the Puyallup Tribe. While some of the information is already known and being used, there is much that is new or described in much more detail. It also is presented in a very professional manner by a professional organization that can be quoted. It should help their understanding and their efforts with the City. Steve.

On Tue, Nov 20, 2018, 8:13 PM Todd Hay <todd.hay.act@gmail.com wrote:

> Dear PSCAA-
>
> Attached is an expert review conducted on the behalf of Advocates for a Cleaner Tacoma (ACT) for the PSE LNG Greenhouse Gas Emissions Lifecycle Analysis SEIS. Please consider this as part of the public testimony on behalf of ACT.
>
> Sincerely,
>
> _____
> Todd Hay, PhD, President
> Advocates for a Cleaner Tacoma (ACT)
> todd.hay.act@gmail.com

Steve: Thank you. So, next up is Seth Storset. Did I get that right?

Seth: Good evening. It's Seth Storset, it was close. Could have been my handwriting.

[04:05:00] So, I'm Seth Storset. I'm the director of safety for TOTE Maritime. I heard some comments about being paid to be here. I am paid by TOTE. But I chose to work for TOTE because of their values and what we stand for. For many of our things we've done in the past like installing the first rain gardens in the port or the first ones to do cold ironing, the only ones still, we've always been a first. And I think, when you're first, it's a little scary. It's a little hard. It's the first time. But it's worked for us, in the past. We know what we're doing is right. Also, just to tie into the port, I've been working here for 13 years.

I have many family and friends that also work here. Todd that spoke earlier, I've seen him out on the ships. He coaches my son's soccer teams. A lot of our views are the same. My dad also works for Tacoma Rail.

[04:06:00] I've lived here my entire life. I believe, and this is with TOTE believes, is that it is the best alternative fuel, at this time. Yeah, it would be great if there was wind power or Tesla batteries that could carry our ships to Alaska. That's just not the case now. So, we're doing what we believe is the best alternative, at this time. I've been out on various ships between the Port of Tacoma and the Port of Seattle. And I've come off and wiped my forehead and taken that soot off. And I don't think that that's necessary. I think everybody would agree that we want cleaner air.

Also, I'd like to add that our sister company in Jacksonville that goes to Puerto Rico has been running off of LNG for the last three years. It's been safe, and they've got clean air. And we're doing it efficiently and responsibly. We would do the same here. So, lastly, as the director of safety and that being my focus, is I want to be able to provide a clean and safe environment.

[04:07:00] And that's what we're trying to do. So, thank you, and appreciate your time.

Carole: Thank you. Dan Streiffert.

Dan: Hi. My name is Dan Streiffert, and I'm the conservation chair for Rainier Audubon, which serves South King County.

[00:38:00] And I would like to speak for the birds. For more than a century, volunteer bird watchers throughout the Americas have contributed observations to Audubon's annual bird count begun as a way to assess the health of bird populations. Data from annual censuses are now key to predicting birds' responses to climate change. The results of a study done by National Audubon showed that, of the 588 species Audubon studied, 314 are likely to find themselves in dire straits by 2080, unless we begin to reduce the severity of global warming and buy birds more time to adapt to the changes coming their way.

But it's not just about climate change. It's also about economics. Tony Seba, an economist working at Stanford University, wrote a book called *The Clean Destruction of Energy and Transportation*. And in this, he predicts that oil, nuclear, natural gas, coal, electric utilities, and conventional cars will be obsolete by 2030.

[00:39:07] This is about clean energy technologies disrupting resource based industries. The clean disruption is inevitable, when you consider the exponential cost improvements of these technologies. The more you make, the cheaper it gets. With gas and oil, the more you extract, the more expensive it gets. Electrifying the global energy system with clean energy is the only way to reach the target set by the Paris Agreement on Climate Change and avoid the catastrophic scenarios outlined by the recent IPCC report. Building a new LNG plant will be a disaster for both the city of Tacoma and PSE rate payers.

There are numerous forecasts the utilities are already overbuilding capacity needed to meet the load. Rising gas prices will, ultimately, result in stranded assets as clean technologies become more economic.

[00:40:00] When PSE ends up defaulting on this project, the rate players will be left bailing them out. There is no economic argument for this plant that makes any sense. Peter Lynch left a comment in PV magazine that sums up the situation succinctly. "The future is rapidly approaching, and for the first time in history, mankind has a clear and unequivocal choice. Move forward with renewables at World War II speed or doom mankind to a slow, painful, and

totally avoidable death." Thank you.

Carole: Thank you. So, I'm going to call up the next five. Maia Syfers, Steven Gilbert, Daniel Bean, Jan Zuckerman, and Frank Leyritz.

1693-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:51:22 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

This facility is being built on Puyallup Tribal treaty land without appropriate permission from the tribe. It is also being built dangerously close to the Northwest Detention Center; if something goes wrong, detainees are incredibly vulnerable to the blast zone with very few options for evacuation.

Sincerely,

Lucinda Stroud
lucinda.stroud@gmail.com
98119

1359-1 22. General Opposition

From: Gene Stubbs
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 10:42:01 AM

Name: Gene Stubbs
Email: stubbsgene@comcast.net
Address: 7032 SW 3rd Ave -
Portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We need to convert to renewable sources of energy and not use fracked gas to save our planet. The window left to save our planet from global warming is closing fast. Please do not approve this new facility.

1361-1 22. General Opposition

From: Gene Stubbs
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 10:41:33 AM

Name: Gene Stubbs
Email: stubbsgene@comcast.net
Address: 7032 SW 3rd Ave -
Portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

We need to convert to renewable sources of energy and not use fracked gas to save our planet. The window left to save our planet from global warming is closing fast. Please do not approve this new facility.

0813-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

B101-3361730



SEATTLE WA 980
23 OCT 2018 PM 6 L

Linda Studley
4610 135 STNE
Marysville WA 98271

I am writing to urge you to reject the LNG plant in Tacoma. The SEIS used is outdated. It uses the 100 year GWP of methane instead of a 20 year value which is more relevant, especially in light of the IPCC data on climate change. We have a short window of opportunity to act to avoid catastrophic climate change. This project takes us in the wrong direction for decades. I urge you to consider the long term consequences of this plant. Thank you. Linda Studley

2012-1 23. General Support

From: Andy Stuth <Andy.Stuth@WRSWeb.Com>
Sent: Wednesday, November 21, 2018 12:08 PM
To: Public Comment
Subject: Support for PSE LNG Project
Attachments: PSE LNG public comment letter.docx

Andy Stuth
Safety Manager
Office 360.366-3303 Ext. 1126
Cell. 360.510.9935



To whom it may concern;

I am writing to you to show my support for the completion of the PSE LNG project at the port of Tacoma. I believe that converting the ships over to cleaner Liquid Natural Gas is a good thing for the environment, those who work on and around the ships, and for the economy in general. I urge you to issue the necessary permits for the completion of this project.

Thank you,

Alvin A. Stuth

0369-2 14. LCA Inputs and Assumptions - Leakage/Slippage
0369-2 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name SHARON STYER

Address or email SHARON@SHARONSTYER.COM

- METHANE GAS LOSES OF ITS VALUE
- SMART VOTE IN OUR AREA
- THIS IS NOT FORWARD THINKING TOWARDS RENEWABLE PRODUCTION FOR OUR FUTURE.
- I FEEL YOU ARE FORCING THIS FACILITY UPON THE CITIZENS OF TACOMA. THE NUMBER OPPOSING THE LNG PLANT ARE INCREASING. NOT I FEEL YOU ARE OBSTINATELY GOING FORWARD.
- I DO NOT TRUST YOU. YOU HAVE CONSTRUCTED THE LNG STORAGE TANK WITHOUT OBTAINING PROPER PERMITS
- YOU ARE OBSCURING FACTS SUCH AS THE SOURCE OF THE FRACKED GAS.
- I'M APPALLED OVER FACES AS PEOPLE SPOKE FACTS & EMOTIONS AGAINST LNG. YOU ARE UNMOVED & YOU LOOK ASIDE WHEN YOU DON'T AGREE.

From: I
To: Public Comment
Subject: ProposedTacoma LNG Project, DSEIS
Date: Thursday, November 8, 2018 6:50:35 AM
Attachments: Tacoma Liquified Natural Gas Project DSEIS.pdf

Attached please find comments on the Tacoma LNG Project, DSEIS.

Wilma Subra

Subra Company

P. O. Box 9813

New Iberia, LA 70562

subracom@aol.com

Pudget Sound Clean Air Agency
1904 Third Ave., Suite 105
Seattle, Washington 98101
publicomment@pscleanair.org

Re: Proposed Tacoma Liquified Natural Gas Project, Draft Supplemental Environmental Impact Statement

November 8, 2018

The following comments are submitted on the Draft Supplemental Environmental Impact Statement (DSEIS) for the proposed Tacoma Liquified Natural Gas Project. The comments focus on the Green House Gas emissions relative to the Tacoma LNG project.

The DSEIS focused on evaluation of Green House Gas (GHG) emissions and their impacts associated with the construction, operation and decommissioning of the Tacoma LNG facility and marine bunkering facility. It focuses on reduction in GHG emissions associated with the project.

Replacement of Fuel

A portion of the reduction of GHG is focused on the replacement of petroleum based fuels (marine diesel oil and diesel fuel) that fuel marine vessels and trucks with LNG in order to reduce overall GHG emissions in the Puget Sound region. This is presented as seeking cleaner fuel for maritime or other transportation users.

1314-1 cont'd 3. Outside of SEIS Scope
1314-2 11. LCA Inputs and Assumptions - General
1314-3 13. LCA Inputs and Assumptions - Natural Gas Source

The DSEIS failed to consider the extensive cost and time frame that would be required to change/retrofit the marine vessels and trucks equipment from petroleum based fuel in all the marine and transportation equipment , to use LNG as a fuel source. In addition, the time to develop and implement regulatory requirements for such changes were not included. In addition, the DSEIS failed to consider the economic impact on companies operating the petroleum based fuel equipment and the GHG emissions to be released during retrofitting of equipment that is currently being fueled by petroleum based fuels.

The proposed LNG project is estimated to take four years to construct and operate for 40 years. There was no consideration of the portion of that 44 year time period when equipment will continue to operate with petroleum based fuels and continue to release GHG emissions at the current rate. Thus the calculations of reduction of GHG emissions in the Tacoma LNG project DSEIS are flawed.

The NOC Order of Approval should not be issued based on the above flaws in the DSEIS.

Source of Natural Gas

The sole source of the natural gas to be supplied to the Tacoma LNG project is presented as being from British Columbia. If the sole source of natural gas is not from British Columbia, for the entire 40 year life of the Tacoma LNG project, the proposed action will not produce a net reduction of GHG emissions.

The difference in the Proposed Action versus No Action for a 250,000 gallons per day facility capacity is only 5.4% less GHG. For a 500,000 gallon per day facility capacity, the difference is only 3.9%.

This is not sufficient reduction in GHG to allow the permitting, construction and operation of the proposed facility, when it all depends on the use of only British Colombia natural gas to be supplied to the proposed activity.

Assuming the availability of British Columbia natural gas for the 40 year life of the Tacoma LNG facility, is too risky, no matter how strict the permit conditions are. If something happens to even a part of the British Columbia natural gas supply, the use of alternative sources of natural gas will result in greater emissions of GHG when compared to the No Action alternative.

Based on data presented in the DSEIS, the GHG emission factors for natural gas production in the United States may be as much as five times higher than for Canada natural gas. In addition, the fugitive emissions from natural gas production in the United States appears to be 60 percent higher than published fugitive emission factors. The combined difference in emission rates of GHG between Canadian and United States could be as high as eight times. Thus, if British Columbia natural gas is not available for the entire 40 years of life of the Tacoma LNG project, and United States natural gas needs to be utilized for portions of the project, the Tacoma LNG project would have an increase in GHG emissions when compared to No Action.

As a result, the Tacoma LNG project should not be granted a NOC Order of Approval.

Wilma Subra

From: Betsy Wheelock
To: Public Comment
Subject: FW: New 3 page fax from 3373672217
Date: Thursday, November 8, 2018 10:14:37 AM
Attachments: fax-2040782.pdf

From: Carole Cenci
Sent: Thursday, November 8, 2018 9:00 AM
To: Betsy Wheelock
Subject: FW: New 3 page fax from 3373672217

From: Main Fax
Sent: Thursday, November 08, 2018 8:38 AM
To: Carole Cenci
Subject: FW: New 3 page fax from 3373672217

Hi,
This is a comment on the LNG process.

Regards,

Steve Bittles,
Administrative Assistant
Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101
(206) 689-4010
SteveB@pscleanair.org

From: no-reply@sendfax.io [mailto:no-reply@sendfax.io]
Sent: Thursday, November 8, 2018 7:06 AM
To: Main Fax
Subject: New 3 page fax from 3373672217

You've received a fax!

- From: 3373672217
- To: 2063437522
- Pages: 3

- Fax Date: 11/8/2018 7:05 AM PST

Subra Company

P. O. Box 9813

New Iberia, LA 70562

subracom@aol.com

Pudget Sound Clean Air Agency
1904 Third Ave., Suite 105
Seattle, Washington 98101
publicomment@pscleanair.org

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November 8, 2018

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As a result, the Tacoma LNG project should not be granted a NOC Order of Approval.

Wilma Subra

1581-1 5. Regulatory Framework
1581-2 10. LCA Calculations
1581-3 22. General Opposition

From: Grace Sullivan
To: Public Comment
Subject: LNG in Tacoma
Date: Wednesday, November 21, 2018 4:52:54 PM

Hello,

I'm writing to provide comment on the SEIS for the LNG facility in Tacoma.

First, I'm very concerned that the treaty rights of the Puyallup Tribe were not respected in this process. I've heard directly from tribal citizens that they were not properly consulted, and this is a huge issue. Tribal treaty rights in the US have historically been trampled on for the sake of industry and economy, and this is reprehensible and must stop.

Second, I feel that the current SEIS is woefully incomplete and is sloppily missing data in places where real data is required. There are numerous tables that contain placeholder data and this is unacceptable. Please hold this report to the same high standards that are expected in any professional industry.

Third, this report does not use the most current scientific data available on greenhouse gasses. This is important because, according to the UN climate report, we have very little time to turn around the impending catastrophic climate change we are facing worldwide. Getting this report right might not feel like that big of a deal, but if everyone around the world cut corners on their own little industrial endeavors, then we would have no chance of regulating anything and making safe and informed choices regarding pollution and greenhouse gasses.

In closing, please take this task seriously and don't put the financial needs of this industry over your commitment to providing professional and unbiased oversight. This LNG project should not be escorted through the permitting processes without thoroughly and honestly assessing its risks and costs.
--
Grace Sullivan

2574-1 22. General Opposition
2574-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2574-3 13. LCA Inputs and Assumptions - Natural Gas Source
2574-4 7. SEPA Alternatives
2574-5 19. LCA Inputs and Assumptions - End Use
2574-6 10. LCA Calculations
2574-7 22. General Opposition

From: gracehhope@everyactioncustom.com on behalf of Grace Sullivan
To: Public Comment
Subject: Grace Sullivan Comment on Tacoma LNG SEIS
Date: Tuesday, November 20, 2018 7:46:56 PM

Dear Puget Sound Clean Air Agency,

Hello,

I am a long time resident of Tacoma and a single mother of two. I am also pursuing my bachelor's degree in molecular & cellular biology at the University of Puget Sound, and I have a deep respect for science. Right now, the entire scientific community of the world has raised the alarm to warn us that we have to act NOW to prevent imminent catastrophic planetary disaster. It would be obscene to ignore this warning, and to continue developing fossil fuel infrastructure in Tacoma would help usher in an era of human suffering that is unconscionable. Please, please take this SEIS report seriously.

This process may just seem like a formality in the road towards approving the LNG facility in Tacoma, but it is clear even to me as a scientist-in-training that the preparers of this report did NOT perform scientific due diligence in their work. If I, as a student, were to turn in such an ill-formed and unfinished to one of my professors, I would not receive a passing grade. Please hold the SEIS preparers to at least as high a standard as I am held to as a student.

Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for

full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Grace Sullivan
3925 N 30th St Tacoma, WA 98407-5311

1749-1 14. LCA Inputs and Assumptions - Leakage/Slippage

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 7:12:13 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models - independent analyses from show that fracked gas leakage rates are much, much worse.

Sincerely,

Grace Sullivan
gracehhope@gmail.com
98407

1760-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 7:10:33 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The recent IPCC report states that we have only a few years left to radically transform our energy system if we are to have a stable climate future - and that means keeping all new fossil fuels in the ground. Clean Air Agency, will you be a climate hero and deny the permit for PSE's toxic fracked gas facility?

Sincerely,

Grace Sullivan
gracehhope@gmail.com
98407

0441-2 3. Outside of SEIS Scope
0441-2 22. General Opposition

Tacoma LNG Facility Testimony
Puget Sound Clean Air Agency
Oct. 30, 2018

In this Supplemental Environmental Impact Statement, you are trying to ascertain the environmental dangers to our air quality that may be inherent in the operation of PSE's LNG plant in Tacoma. In assessing how much risk is involved in operating this plant, I'm sure you are not expecting a finding of no risk. Natural Gas is inherently dangerous, as a pollutant, as a highly explosive substance, and as a greenhouse gas. The question is how much risk is acceptable. In order to determine this, you will have to weigh the risks against the benefits to the community. A finding of great benefit would naturally skew the acceptable risk upwards. A finding of no benefit would make no finding of risk acceptable.

What are the benefits of locating a fourteen-story bomb in a heavily populated area? The government is investing heavily in this project because there is great concern about maintaining energy independence in a troubled world. But this facility is adding little to our energy independence. Only 7% of the energy stored at the plant will be available to the community. The other 93% will be sold for the private benefit of PSE. Other than the creation of a small number of permanent jobs, the benefits accruing to the community simply do not merit the level of risk. I'm asking you to reject this permit.

Terry Sullivan
Vashon Island resident
206 463 2812
terry.sullivan46@gmail.com

Carole: Thank you. Terry Sullivan? Before you start, I'm going to go ahead and call the next group up just to save a minute or so. So, the next group of speakers is Mark Wells, Steve Gilbert, Kevin Jones. Jori Atkins, and Todd Hay.

Terry: Hi. My name is Terry Sullivan. And I'm a Vashon Island resident and a PSE rate payer. And although I agree entirely with all of the reasons presented thus far in opposition to this project, I wanted to present one other particular aspect that I don't think has been addressed.

[01:05:03] What you're trying to do here is to ascertain the environmental dangers in our air quality that may be inherent in the operation of this project, this plant. And in assessing how much risk is involved in operating this plant, I'm sure you're not expecting to find a finding of no risk. Natural gas is inherently dangerous as a pollutant, as a highly explosive substance, and as a greenhouse gas. The question is how much risk is acceptable. In order to determine this, you'll have to weigh the risks against the benefits to this community. A finding of great benefit would, naturally, skew the acceptable risk upwards.

A finding of no benefit would make no finding of risk acceptable. What are the benefits of locating a 14 story bomb in a heavily populated area?

[01:06:00] The government is investing heavily in this project, so we're told, because there's a great concern about maintaining energy independence in a troubled world. But this facility is adding little to our energy independence. Only seven percent of the energy stored in that plant will be available to this community. The rest of it, the other 93% will be sold for private profit for PSE. Other than the creation of a small number of permanent jobs, the benefits accruing to the community, for this project, simply do not merit the level of risk. I'm asking you to reject this permit.

1226-1 3. Outside of SEIS Scope

1266-1 22. General Opposition

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Theo Sullivan Age 11

RECEIVED
NOV 21 2018
Puget Sound
Clean Air Agency

1502-1 22. General Opposition

From: Casey Sundermann
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:15 PM

Name: Casey Sundermann
Email: csund5@msn.com
Address: 5847 NE 31st Ave. -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The massive hurricanes and horrendous fires in California not enough to convince you that more and more fossil fuel infrastructure is hurting our planet? Please say no to the LNG Pipeline project. Fracked gas does not just hurt Washington State and Tacoma, it hurts everyone who needs clean air and clean water.

2560-1 22. General Opposition
2560-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2560-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2560-4 19. LCA Inputs and Assumptions - End Use
2560-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2560-6 13. LCA Inputs and Assumptions - Natural Gas Source
2560-7 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Susan Sweetwater
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Friday, November 2, 2018 11:35:00 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I am soundly opposed to PSE's Liquefied Natural Gas project being built in Tacoma.

The science in the latest IPCC report makes it clear that all resources - public and private - are best applied to rapid expansion of renewable energy sources. It is dangerous and short sighted to proceed with this project given what we know about fossil fuel's impact on the environment.

Additionally, there are some real concerns with the information and process involved with this project. Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Respectfully,

Susan Sweetwater, LICSW

Susan Sweetwater
sasweetwater@gmail.com
9112 NE Spruce Ave
Indianola, Washington 98342

1614-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1614-2 3. Outside of SEIS Scope
1614-3 13. LCA Inputs and Assumptions - Natural Gas Source
1614-4 14. LCA Inputs and Assumptions - Leakage/Slippage
1614-5 5. Regulatory Framework
1614-6 3. Outside of SEIS Scope

From: Kara Sweidel
To: Public Comment
Subject: Please REJECT the permit for the Tacoma LNG facility
Date: Wednesday, November 21, 2018 4:14:35 PM

Hello,

I am writing to submit my comment against the LNG facility in Tacoma. The most recent SEIS did not use the most recent Global Warming Potential (GWP) value for methane. Though I have heard that the older values are currently accepted for use, given the recent IPCC report on climate change, we should be using the most recent available data any time we analyze a project. In addition to that concern that I have, I am also concerned, given the IPCC report, that the analysis has chosen to use 100 year GWP values rather than 20 year values. We need to be looking at how this project will be impacting us right now, when the next few years we have to dramatically cut greenhouse gas in order to save the planet.

Though I realize you are the Puget Sound Clean Air Agency, emissions do not stop at neatly identified bureaucratic boundaries. For this reason, I think we need to be considering that the majority of the fuel at this facility will come from fracking. I am going to assume you have general knowledge of fracking and that I do not need to explain the current devastation being experienced by communities near fracking operations, such as being able to light their tap water on fire and seeing earthquakes in areas not near fault lines. It is imperative that we do everything in our collective power to stop the increase in fracking as a process. We have no way to know that we will only be receiving gas from the one source in BC listed in the SEIS. As we saw when the most recent explosion happened, customers receiving gas from BC had to get it from North Dakota, which has higher leakage rates.

And though it is hard for me to say which reason is the most important, I will say one of the biggest issues here is that this facility is being built without the consent of the Puyallup tribe. The Tacoma Tideflats are their land, per the Medicine Creek Treaty. This is an insult to a nation that has already experienced genocide by colonizers, and now their land is being stolen again. Of note is that there is actually recent legal precedent to back this up, as a court case nearly one year ago found two protesters not guilty of trespassing on the LNG construction site. In that case, tribal elder Ramona Bennett testified explaining Puyallup rights to the land through the Medicine Creek Treaty, and the jury found that they were not able to convict protesters of trespassing, as the land did not belong to the City of Tacoma.

Finally, this facility, if it were to explode as the Plymouth LNG facility did in 2014, many lives would be lost. The LNG facility is dangerously close to the Northwest Detention Center, which has a shelter in place policy, meaning those being detained even though they have not committed crimes will be subject to breathing toxic air, or worse. There are homes, preschools, and businesses within the blast zone. These people do not deserve to have their lives threatened by this facility.

Please reject the air permit for the LNG facility.

Thank you,
Kara Sweidel
Seattle, WA

[00:41:00] And if you can keep it under three minutes that would be wonderful. A couple of minutes would be even better. But you do have the full three minutes. So, I'm sorry, Maia Syfers.

Maia: Hi, thank you. My name is Maia Syfers. I work as a nurse practitioner in Tacoma. Two-thirds of natural gas is obtained through fracking, in the US. And per the Sight Line Institute, the estimation is at least half of northwest natural gas is fracked. According to a comprehensive analysis of scientific studies by the Natural Resources Defense Council, there is a growing body of evidence linking the air pollution from hydraulic fracking to global, regional, and local community health impacts. Global effects include the associated methane gas leakage contributing to overall climate change.

[00:42:00] Regional and local affects from nitrogen oxide with multiple volatile organic compounds together forming ground level o-zone and exposure to diesel particulate matter and toxic volatile compounds, such as toluenes, xylenes, benzenes can cause multiple health complications. These include upper and lower respiratory problems, brain and nervous system effects, bone marrow and immunological compromise, reproductive effects due to endocrine disruption, and damage to fetal and child development and various cancers.

As a healthcare provider, I practice by the axiom to first do no harm. As a public agency, the PSCAA is entrusted with the responsibility to protect public health through access to clean air. Whether or not fracking is currently happening in Washington is not relevant.

[00:43:00] It is likely the percent of LNG obtained through fracking will increase to meet supply demands, in the future. Approving air pollution anywhere is not in the public health interest. And it, certainly, would be disingenuous to claim that pollution can be contained in a living ecosystem.

The PSCAA website mission statement quotes, "We work together to clean the air we breathe and protect our climate through education incentives and enforcement. Strategies include adopting and enforcing air quality regulations, sponsoring voluntary initiatives, and educating people and businesses about clean air and climate friendly choices they can make." I ask PSCAA to help Puget Sound Energy make that climate friendly choice regarding the Tacoma LNG plant by recognizing the significant air pollution

1181

1181-1 3. Outside of SEIS Scope
1181-2 3. Outside of SEIS Scope
1181-3 3. Outside of SEIS Scope

issues created by the project. Thank you.

1309-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1309-2 13. LCA Inputs and Assumptions - Natural Gas Source

From: Maia Syfers
To: Kevin Jones
Cc: Public Comment
Subject: Re: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, October 31, 2018 7:07:28 PM

Hi Kevin,
Very nicely laid out. Appreciated reading it as very informative to me.
Maia

On Oct 31, 2018, at 12:16 PM, Kevin Jones <kevinjonvash@gmail.com> wrote:

Tacoma LNG Facility Testimony – Puget Sound Clean Air Agency

My name is Kevin Jones. I am a PSE ratepayer. I have 35 years of engineering project planning, implementation and risk management experience working for The Boeing Company. Now retired, I have not been paid to testify and will receive no financial benefit due to your final permit decision. I oppose issuing the permit to PSE for the Tacoma LNG facility.

Thank you for performing a Supplemental Environmental Impact Statement (SEIS) for the Tacoma LNG Facility. I was quite concerned when upstream gas emissions were dismissed by the City of Tacoma as "too remote to the project site and the City of Tacoma to be part of the EIS". Of course, these emissions pour into the only climate we have.

Unfortunately, the SEIS conclusion is based on upstream gas emissions which are not credible. Gas as a bridge fuel is now a known myth due to much higher than reported upstream methane leaks. The SEIS makes erroneous and unreasonable assumptions about these upstream gas emissions. Historically, upstream gas emissions are higher than reported. In 2016 The Economist noted that upstream gas leaks in the United States are underestimated by about 30%. The Atmospheric Chemistry and Physics group recently reported that gas leaks in British Columbia are under-reported by 43%. If this assessment is applied to the upstream gas emissions in the SEIS we find the stated greenhouse gas emission reduction of the proposed scenario A action falls from 40,000 tons to 6440 tons.

Basing permit approval on a net greenhouse gas emission reduction of less than 1% would not pass muster in a high school level engineering class. Further, a permit issued for the LNG facility, based on this erroneous SEIS, will result in a fossil fuel facility investment that locks us into an approach that provides no proven environmental benefits over a multi-decade time period during which time true environmental solutions to maritime shipping pollution could emerge.

In addition to the unreliable British Columbia fugitive gas emission data, the SEIS also assumes a reliable British Columbia delivery network over the entire life span of the

facility. The October 9 pipeline explosion, which PSE euphemistically calls an "unexpected rupture", adds significant doubt to this reliability. You heard testimony that the LNG facility can mitigate the risk of a pipeline explosion. In fact, pipeline explosions create significant risk to achieving the important (though specious) SEIS caveat that all the source gas must come from British Columbia.

The SEIS, when corrected to use reasonable upstream gas emission leak levels, indicates an unacceptable risk regarding greenhouse gas emission reductions. The conclusion that the proposed action reduces greenhouse gas emissions is based on SEIS fiction. When other system level factors are considered, like the outdated global warming potential values and using 100-year versus 20-year values, the SEIS conclusions are not credible.

Based on these factual errors in the SEIS, you must reject this permit.

Kevin Jones
Vashon Climate Action Group
206-463-1766
kevinjonvash@gmail.com

1309-2 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
1309-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

1625-1 3. Outside of SEIS Scope
1625-2 3. Outside of SEIS Scope

From: Maia Syfers
To: Public Comment
Subject: Public Comment on DSEIS, PSE LNG Project
Date: Sunday, October 28, 2018 11:31:37 AM

To PSCAA:

My name is Maia Syfers, and I work as a nurse practitioner in Tacoma. Two thirds of natural gas is obtained through fracking in the US and the Sightline Institute estimates at least half of NW natural gas is fracked. According to a comprehensive analysis of scientific studies by the Natural Resources Defense Council, there is a growing body of evidence linking the air pollution from hydraulic fracking to global, regional and local community health impacts. Global effects include methane gas leakage contributing to overall climate change. Regional effects from nitrogen oxides and multiple volatile organic compounds forming ground level ozone can cause respiratory problems and cardiovascular problems. In local communities, exposure to diesel particulate matter and toxic volatile compounds such as toluenes, xylenes and benzenes can lead to upper and lower respiratory problems, brain and nervous system effects, bone marrow complications, immunological compromise, reproductive system effects due to endocrine disruption, damage to fetal and child development, and various cancers. According to studies evaluated by the Union of Concerned Scientists The EPA has identified more than 1,000 chemical additives that are used for hydraulic fracturing

As a health care provider I practice by the axiom “to first do no harm”. As a public agency, the PSCAA is entrusted with the responsibility to protect the public's access to clean air. The Precautionary principle implies a social responsibility to protect the public from exposure to harm when scientific investigation has found a PLAUSIBLE risk. This principle has been explicitly incorporated into various laws and regulations in the European Union and various international bodies including the UN. Whether PSCAA officially endorses this principle or not, it nonetheless IS the basic risk/benefit approach that should guide and inform decisions regarding public trust, especially when confronted with the scientific evidence being presented at this hearing. The PSCAA website mission statement quotes “We work together to clean the air we breathe and protect our climate through education, incentives and enforcement. Strategies include adopting and enforcing air quality regulations, sponsoring voluntary initiatives and educating people and businesses about clean air and climate friendly choices they can make”. I ask the PSCAA to help PSE make that climate friendly choice regarding the Tacoma LNG plant by recognizing the significant air pollution issues the project entails. Protect our air, our climate and our health and not corporate profits.

1660-1 22. General Opposition

From: Maia Syfers
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 13, 2018 3:11:53 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

I testified as a health care provider on October 30th along with many others. I was dismayed to see PSE and other business interests sending representatives to testify for their vested business interests. Their consistent rationales presented, including calling LNG a "bridge fuel" which burns cleaner, the number of jobs the plant might possibly create or the issue of container ship fueling, was accurately rebutted by multiple other speakers. I heard a climate scientist who had done her own analysis of the draft SEIS, a toxicologist, other scientists and environmentalists speak to the inaccurate and incomplete data leading to the draft SEIS conclusions. I also heard each of the business interest points analyzed and exposed as misrepresentations of the truth. I am not going to spell out out the scientific and data source and analysis concerns about the draft SEIS as you will have heard about these from multiple knowledgeable sources. I would like to remind PSCAA that your mission is the protection of air quality in the public domain, and that letting business interest rationalizations (using already disproven arguments) supersede that imperative is simply being party to the overall dominance of corporate power so harming our society today. Allowing any fossil fuel based project to go forward when we need to expand true renewable energy infrastructure instead is a betrayal of the public trust. I hope the public can count upon your integrity and your own concerns for the world we are leaving our children.

Thank you.

Maia Syfers, ARNP

Maia Syfers
msyfers@comcast.net
28409 Vashon Hwy SW
Vashon, Washington 98070

1685-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 14, 2018 8:31:36 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I absolutely oppose the LNG facility. Listen to what people are saying! The time to end oil & gas and all fossil fuels is now.

Sincerely,

Hallie Sykes
hmharness@gmail.com
98109

2238-1 22. General Opposition
2238-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2238-3 10. LCA Calculations
2238-4 13. LCA Inputs and Assumptions - Natural Gas Source
2238-5 11. LCA Inputs and Assumptions - General

From: Kris Symer
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Tuesday, November 20, 2018 6:40:26 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Kris Symer
ksymer@gmail.com
3919 N 9th St
Tacoma , Washington 98406

1720-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 12:33:37 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Nick Szumlas
szumlasnl@yahoo.com
98380

Dear PSCAA...

Global Scientists Agree! We Must Leave Remaining Fossil Fuels In The Ground.

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency



Other options should be looked at to help clean up emissions from the shipping industry.
We have more choices than LNG or doing nothing.
New technologies are continuing to emerge & we must look for a renewable path.

Name Lily.T Age 14

RECEIVED
NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Please be a HERO for future generations!



We Need Your Help! This project would lock us into decades of more fossil fuel use.
With only a dozen years left to make drastic changes or face irreversible climate chaos,
we can't keep allowing corporations to build new infrastructure.
I hope to one day have children and grandchildren of my own.
Your agency can help keep this a possibility by denying the air permit for the proposed Tacoma LNG project.

Name Lily.T Age 14

Letter On back →

0448-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name ASIA TAUL

Address or email asiamarietail@gmail.com

I write as a citizen of the Cherokee Nation, born & raised on Puyallup Territory. The Puyallup have been stewards & caretakers of these lands since time immemorial, and are welcoming & generous hosts despite generations of cruelty from the settlers of this region. I am referring both to historic genocide & broken treaties, but also to more recent history - within my life time for instance the City of Tacoma tried to deny the Puyallup Tribe their sovereign treaty rights claiming 'they did not exist'. Despite this incredible fiscally motivated insult, the Tribe has continued to generously consult with & work alongside the City in the years since the settlement. The fact that

again, ~~recording~~ over & over, the City of Tacoma & the Port, governmental & private ~~agencies~~ alike have continued to attempt to undermine tribal sovereignty, against the laws of their own country, in a transparently selfish land grab, is disgusting and makes me ashamed to be a resident of Tacoma & an employee of the City of Tacoma. Please do not add another injustice to this long history of violence & oppression of Indigenous rights. The data shows that climate change will impact POC ~~communities~~ & low income communities the most, and the societal impact caused by institutionalized racism & the legacy of stolen land in this country is more than apparent for example 84% of Native women are raped or assaulted in their lifetime. ~~This is not a~~ similar facts are not coincidences & the ecological industry ~~equivalent~~ owes Indigenous communities, some of the most vulnerable populations in the world, a ~~complete~~ overhaul. Please make the ethical & legal decision, respect treaty rights & tribal sovereignty, and deny the permit.

0308-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0308-2 13. LCA Inputs and Assumptions - Natural Gas Source
0308-3 14. LCA Inputs and Assumptions - Leakage/Slippage



Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

L. & T. Takacs
5901 212th St SW
Lynnwood WA 98036

Outdated Science was used in the Tacoma
A 20 year time span would be more approriate
Fracking B.C. gas is not as clean as claimed
Methane leaks at every point from extraction to transmission
Best practice of calculation show more Methane will escape from the plant + ships than used in Analysis

L Takacs

November 12, 2018

RECEIVED
NOV 15 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
Attn: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave. Suite 106
Seattle, WA 98101

Dear Clean Air Agency,

We moved to Tacoma in 2000. We particularly appreciate the natural beauty and the civic spirit in this town. One of us works downtown at UW Tacoma, and we live just a few miles from downtown.

We urge the Puget Sound Clean Air Agency to redo the draft SEIS. The draft SEIS falls short of accounting for what the best and most recent scientific evidence tells us is the full impact of fracked gas on global warming. Without using the latest scientific evidence, the draft SEIS is flawed, and permitting based upon would be an injustice.

We recognize that fracked gas likely produces less carbon emission than coal when burned, when one account for its production, transport, processing, storage, and distribution, the net effect on climate will be worse than coal due to the release of methane at each stage.

We are quite concerned that the draft SEIS uses an outdated methane global warming potential (GWP) value. Recent values from the 2013 IPCC should be used. More importantly, the 20-year GWP value from this report should be used, rather than the 100-year GWP, given the urgency of taking action on global warming.

Finally, we believe that Puget Sound Energy's beginning their construction of the LNG plant without receiving permitting approval is a misuse of the public trust. At the same time as the general public's rights need to respected throughout the process, the Puyallup Tribe treaty rights must also be respected.

Respectfully,

Josh Tenenberg Jody Wright-Tenenberg

Josh Tenenberg and Jody Wright-Tenenberg
3316 N. 8th St.
Tacoma, WA 98406

0755-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
0755-2 3. Outside of SEIS Scope

1373-1 22. General Opposition

From: Kathyrn TenHoopen
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:28:02 AM

Name: Kathyrn TenHoopen
Email: lunamayah3@gmail.com
Address: 2424 NE 17th Ave -
Portland, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don't subject us to future DISASTER!!

1149-1 23. General Support

[06:03:00] Beverly Christie? Janine Terrdao?

Janine: Hi, good evening. My name is Janine Terrano. I am the CEO of Topia Technology here in Tacoma. And since I moved to Tacoma in 1999, I have embraced the incredible cultural and economic rebirth of Tacoma. I have witnessed a struggling community keep its soul but take its challenges head on with bold new thinking and leadership. One of the most fundamental challenges Tacoma faced was with a dirty environmental legacy that prohibited growth. We had the aroma of Tacoma, a polluted tide flats, a polluted Thea Foss Waterway, and finally, we had one of the world's worse polluters in Asarco.

[06:04:00] But Tacoma changed. We embraced our challenges. And a new environmental stewardship emerged. The Port of Tacoma cleaned up its properties. The aroma of Tacoma is gone. Thea Foss Waterway and its uplands are clean and now home to many Tacomans. And finally, the Asarco site is now clean. And Point Ruston is home to thousands of families, shops, and restaurants. Tacoma faced its challenges with innovation and, most importantly, with leadership. Tacoma is a cleaner, more vibrant community today than it was 25 years ago.

As a person in the business of technology and innovation, I applaud our home town company, TOTE Maritime, for having the vision and the courage to convert its orca class vessels to LNG. I'm also a fly fisherman and an environmentalist and a resident of Pierce County. I thank them for going way beyond what federal, state, and local requirements are and to do the right thing for our planet.

[06:05:00] This is a company trying to do the right thing. We should celebrate this. We should applaud their extraordinary commitment. And we certainly should not punish them. Data is my business. I look at it every day. And according to the results of the study, we all know that diesel is far more polluting than LNG. This project, according to the SEIS, reduces greenhouse gases by a minimum of 13.5%. It reduces particulate matter by 99%, sulfur oxides by 100%, nitrogen oxide by 90%. We've all heard the challenges around LNG. And is it perfect? No, it's not. However, it is a transitional fuel that takes a major step away from polluting our environment.

The choices on this are crystal clear. We can either take a major positive step forward or a major step backward.

[06:06:03] I support TOTE Maritime's decision to convert to LNG, and I support this project.

1995-1 23. General Support

From: Janine Terrano
To: Public Comment
Subject: Public comment in support of Tote Maritime Clean Air Coalition
Date: Wednesday, November 21, 2018 2:44:29 PM
Attachments: Janine Terrano supporting Remarks.docx

Please accept my comments in support of allowing Tote Maritime to convert their vessels to LNG.

Thank you,
Janine Terrano

Memo to: PSCAA

Regarding: Public Comment in Support of Tote Maritime Clean Air Coalition

My name is Janine Terrano and I am the CEO of Topia Technology based right here in Tacoma. Since moving to Tacoma in 1989, I have embraced the incredible cultural and economic rebirth of Tacoma. I have witnessed a struggling community keep its soul but take its challenges head-on with bold new thinking and leadership.

One of the most fundamental challenges Tacoma faced was with a dirty environmental legacy that prohibited growth. We had the aroma of Tacoma, a polluted tide flats, a polluted Thea Foss Waterway and finally we had one of the world's worst polluters, Asarco.

Tacoma changed. We embraced our challenges and a new environmental stewardship emerged. The Port of Tacoma cleaned up its properties and new shipping lines operate where polluted land once was. The aroma of Tacoma is gone. Thea Foss Waterway and its uplands are clean and now home to many Tacomans. And finally, the Asarco site is now clean, and Point Ruston is home to thousands of families, shops, and restaurants. Tacoma faced its challenges and with innovation and leadership, Tacoma is a cleaner, more vibrant community today than it was 25 years ago.

As a person in the business of technology and innovation, I applaud our hometown company TOTE maritime for having the vision and courage to convert its Orca class vessels to LNG. As a fly fisher, environmentalist, and resident of Pierce County, I thank them for going way beyond what federal, state, and local requirements are and to do the right thing for our planet. We should celebrate this extraordinary commitment, not punish it.

I look at data every day and here is the data I know to be true on this project.

- Diesel is FAR more polluting than LNG
- This project according to the SEIS reduces Greenhouse gases by a minimum of 13.5%
- It reduces particulate matter by 99%
- Sulfur Oxides by 100%
- Nitrogen oxide by 90%

Is LNG perfect? The answer is no. However, is it a transition fuel that takes a major step away from more polluting fuels? The answer is a resounding yes.

The choices on this are crystal clear. We can either take a major positive step forward or a major step backward. I support TOTE Maritime's decision to convert to LNG. Every day we wait is another day of air and water pollution we can no longer afford. As a fisher, conservationist, and as a person in the technology and innovation business- I would urge you to approve this air permit in a timely manner. Just yelling no to LNG is just old divisive politics and it does nothing to protect our environment or our planet. Saying Yes to LNG moves us closer to a greener and sustainable future. By the way, I hope the air

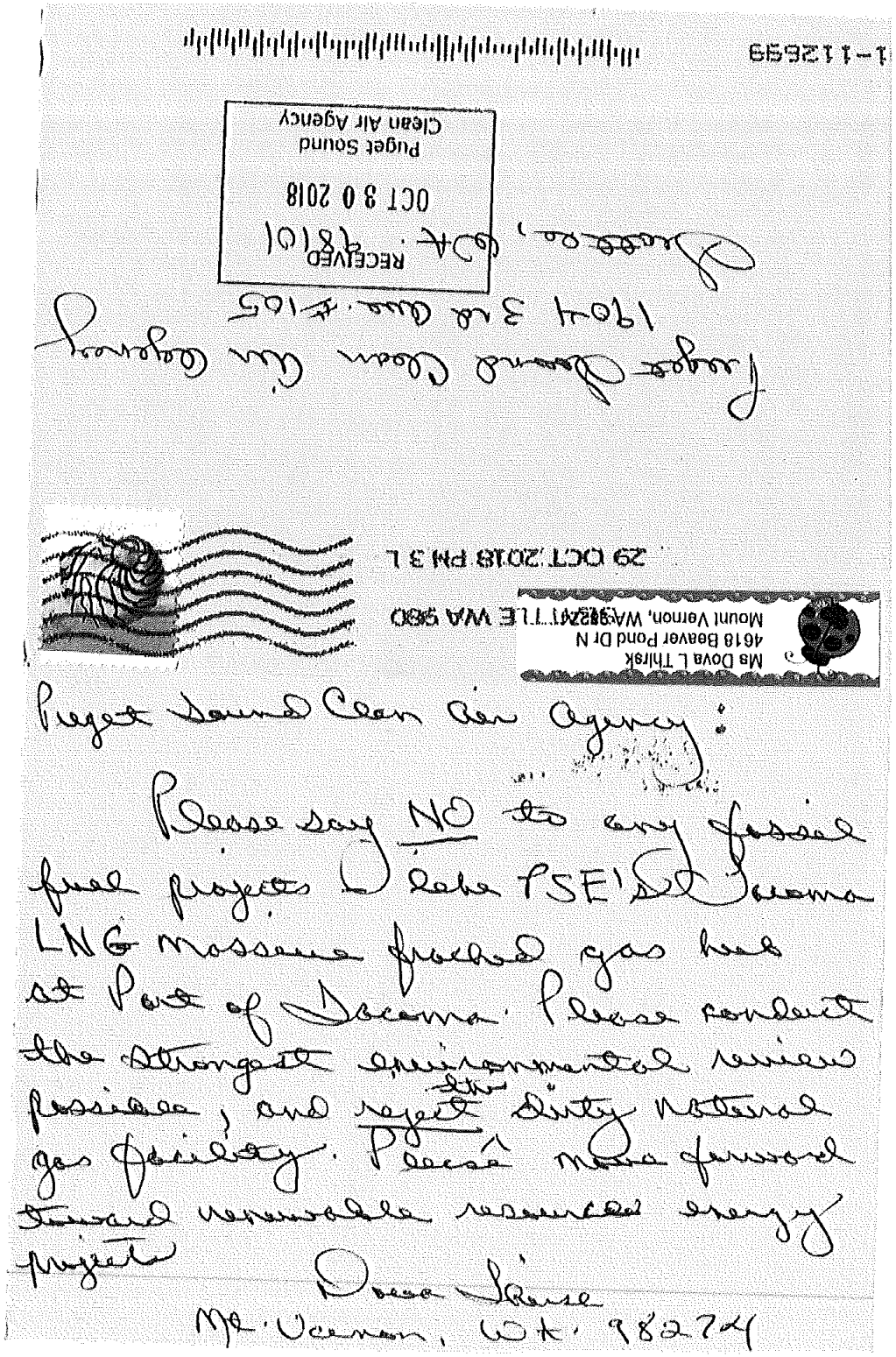
agency holds itself and the opponents accountable for every day TOTE is forced to use diesel with all of its pollution instead of LNG.

Sincerely,

Janine Terrano, CEO

Topia Technology

0653-1 22. General Opposition



Ms Dova L Thirsk
4618 Beaver Pond Dr N
Mount Vernon, WA 98274-7116

98273 WA 980

29 OCT 2018 PM 3 L

RECEIVED
OCT 30 2018
Puget Sound
Clean Air Agency

1-1125699

Puget Sound Clean Air Agency
1904 3rd Ave. #105
Seattle, WA 98101

Puget Sound Clean Air Agency:

Please say NO to any fossil fuel projects like PSE's Tacoma LNG massive fracked gas leak at Port of Tacoma. Please conduct the strongest environmental review possible, and reject Dirty natural gas facility. Please move forward toward renewable resource energy projects

Dova Thirsk
Mt. Vernon, WA. 98274

2006-1 23. General Support

From: Thomas, Stephen
To: Public Comment
Subject: RE : Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 2:26:06 PM
Attachments: image001.jpg

Dear PSCAA :

The Tacoma LNG Project just makes sense. We already have made great improvement in our release of " Green House Gases " by converting the local bus lines to natural gas and removing the ugly black exhaust. The next step is to convert our shipping to the natural gas in the form of Liquid Natural Gas (LNG). Our water ways are one of our most valuable assets that must be protect to insure the wild life for future generations. PSE's Tacoma LNG Project is a great step in improving emissions from the Alaskan shipping. I approve of the project and hope for the State of Washington will lead the way for other application's of LNG in our state.

Best Regards,

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Carole: Thank you. Bradley Thompson?

Bradley: Good evening. My name is Bradley Thompson. I'm a registered nurse. I'm also a volunteer with 350 Tacoma. I'd like to start by acknowledging that we're standing on ancestral territory of the Puyallup People. It is a violation of treaty rights that the tribe has not been properly or meaningfully consulted on this LNG project.

[05:05:02] And I ask for that process to begin immediately. On behalf of 350 Tacoma, we incorporate, by reference, the comments of the Puyallup Tribe and agree with their statements. I agree with many other speakers tonight that this draft SEIS is inaccurate and incomplete. And so, it feels impossible to comment on a flawed analysis that does not account for the full climate impacts of fracked gas. I'm asking you to go back to the drawing board, in order to more thoroughly complete the report, publish a revised draft, and then, hold another public comment period.

Mostly, tonight, I'd like to note that your draft SEIS was released on October 8, the same day that the UN Intergovernmental Panel on Climate Change released its urgent wake up call. This report prepared by the world's leading climate scientists says that we must cap the rising global temperature to just 1.5 degrees, and this much happen much faster than previously recognized.

[05:06:00] And doing that will require "rapid, far reaching, and unprecedented changes in all aspects of society." In order to achieve that, global emissions of carbon dioxide have to reach net zero by 2050. As you're probably aware, that's going to be almost impossibly difficult to achieve. And yet, our planet's livability depends on that. What does that mean? It means that we've got to stop building new 50 year fossil fuel infrastructures starting like 20 years ago. It means that an environmental impact statement shouldn't compare new fracked fossil gas infrastructure to a no action alternative, but rather to a do something different please alternative.

It means that we can't be locking ourselves into increased dependence on fossil fuels but rather should be investing in real, green alternatives that, contrary to what other people have said, currently exist, even in the maritime sector.

[05:07:09] It means that agencies like yours can no longer do business as usual, if we want to have a real shot at keeping this planet habitable for future generations. It means that people who have

power to deny permits and stop new fossil fuel infrastructure from being built, such as yourselves, need to take bold, brave action. My ask is that you incorporate the recommendations of the IPCC report into this SEIS to make transparent the consequences of the decision that you make. Thank you.

1623-2 13. LCA Inputs and Assumptions - Natural Gas Source
1623-2 13. LCA Inputs and Assumptions - Natural Gas Source
1623-3 13. LCA Inputs and Assumptions - Natural Gas Source

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 11:36:46 PM
Attachments: image1.png
image2.png

Dear Puget Sound Clean Air Agency,

In this comment, I am questioning the assurances that you have from Puget Sound Energy (PSE) that 100% of the fracked fossil gas supply for the Tacoma LNG project would come from British Columbia. There are numerous studies from Canada that question the voracity of the self-reported methane leakage rates from fracked fossil gas infrastructure in B.C. Methane leakage rates from fracking wells and natural gas transmission infrastructure in the United States are significantly higher, placing even greater doubt upon the claims made in B.C.

Interestingly enough, now the Kalama Methanol project in their SEIS makes the same claim that they will source 100% of their fracked fossil gas from B.C., thereby improving their cumulative GHG numbers.

Puget Sound Energy has long claimed that they source their natural gas supply from three areas: B.C., Alberta, and the Rocky Mountains. In fact, in their 2017 filing with the Securities and Exchange Commission (SEC), PSE reports obtaining natural gas from British Columbia (54.8%), Alberta (19.1%), and the United States (26.1%).

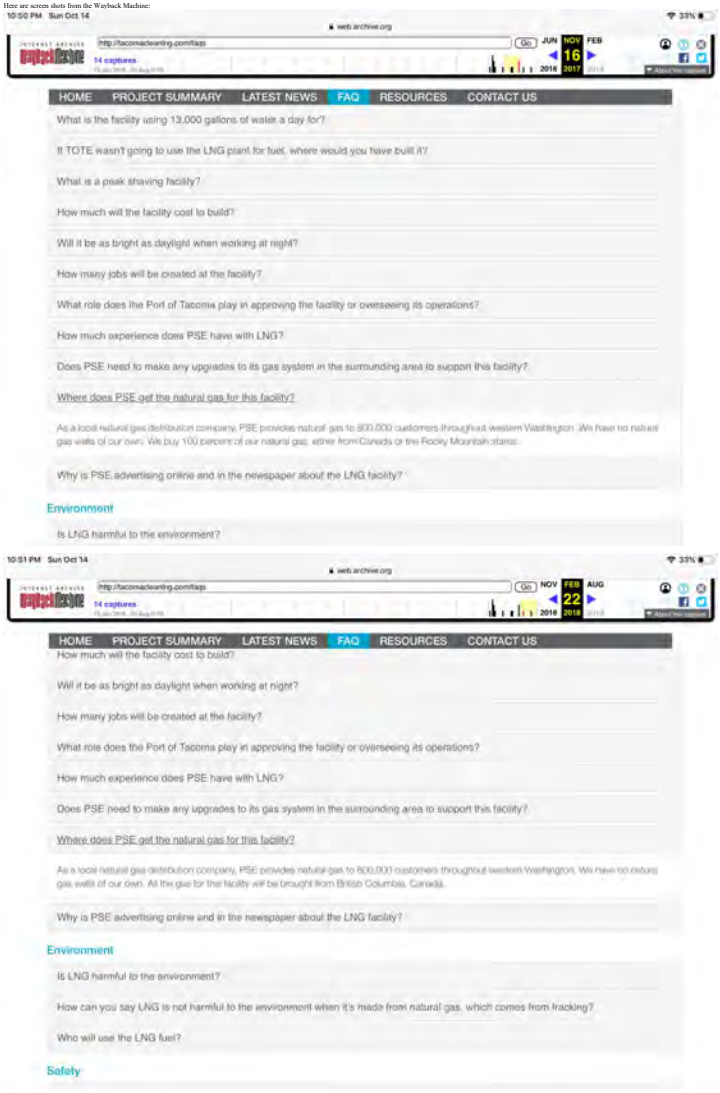
Interestingly, on November 5, 2017, Puget Sound Energy stated on its Tacoma Clean LNG website: "We have no natural gas wells of our own. We buy 100 percent of our natural gas, either from Canada or the Rocky Mountain states." On November 16, 2017, they made the exact same claim. But then the website was updated. By February 22, 2018, the website stated: "All the gas for this facility will be brought from British Columbia, Canada."

So...what changed between November 16, 2017 and February 22, 2018? On January 24, 2018, Puget Sound Clean Air Agency announced their Notice of Determination for a Supplemental EIS, requiring a cumulative analysis of the greenhouse gas impacts of the Tacoma LNG project. Could it be that Puget Sound Energy, and Kalama Methanol, are both cherry picking their numbers in order to provide a best-case analysis of the GHG impacts of their projects?

If Kalama Methanol and Tacoma LNG both source 100% of their natural gas from British Columbia, is there enough currently existing gas supply using currently existing transmission pipeline infrastructure. If not, then the GHG impact of any additional fracking wells or transmission infrastructure must be added to both projects' SEIS.

I ask that the SEIS analysis use Puget Sound Energy's currently existing gas supply percentages: B.C. 54.8%, Alberta 19.1%, and Rocky Mountains 26.1%. The GHG analysis must include methane leakage rates based upon those percentages from the different supply sources. Puget Sound Energy should not be able to cherry pick their numbers for the SEIS, only to change up their supply sources once the project is up and running.

Here are screen shots from the Wayback Machine:



pscleanair.org
Puget Sound Clean Air Agency

Clean healthy air for
everyone, everywhere,
all the time.

Board of Directors

Bremerton
Greg Wheeler, Mayor

Everett
Cassie Franklin, Mayor
Paul Roberts, Board Chair

King County
Dow Constantine, Executive

Kitsap County
Edward Wolfe, Commissioner

By email and US Mail

January 24, 2018

Mr. Keith Faretra
Puget Sound Energy
MS PSE-09S
10885 NE 4th St.
Bellevue, WA 98004

Re: Notice of Determination for a Supplemental EIS
Notice of Construction Application No. 11386
Tacoma LNG Facility

Dear Mr. Faretra:

This letter is being sent to inform you that the Agency has determined that a Supplemental Environmental Impact Statement (SEIS) is required to identify and analyze greenhouse gas (GHG) emissions and impacts for this Notice of Construction (NOC) application to supplement what was

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

1627-1 10. LCA Calculations
1627-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1627-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1627-4 13. LCA Inputs and Assumptions - Natural Gas Source
1627-5 6. Purpose and Need

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 11:03:03 PM

Dear Puget Sound Clean Air Agency,

I submit the following comments regarding the draft SEIS for the Puget Sound Energy Liquefied Natural Gas project:

- **The Draft SEIS is Incomplete** – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. I request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- **SEIS is Using Outdated Methane Global Warming Potential Value** – Your analysts did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane, however has a much larger GWP value. The DSEIS uses the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas it should be using the 2016 value of 32. Everything else being equal, making this one modification in your models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with diesel fuel.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- **Analysis is based on 100-year, not 20-year, global warming potential (GWP) values** – Your analysis is based on the 100-year GWP of methane, whereas, given the IPCC report that was released October 8, 2018, we must change our energy fuel mix in the next 12 years or face dire climate consequences. The SEIS analysis should use the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- **Questionable claims that B.C. fracked gas is as clean as they claim –** You indicate that the fracked methane gas from B.C. has a much smaller leakage rate. However you fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- **What assurances do we have that all of the fracked gas would come from BC?** You claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw with the recent natural gas pipeline explosion in BC, Puget Sound Energy was able to use natural gas from the Rocky Mountains. The methane leak estimates from the U.S. are significantly higher than those reported from B.C. We have no guarantees that the gas used would come from B.C. Of note, per Puget Sound Energy's 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). We ask that you use those percentages in your calculations.
- **Analysis assumes credit for extra maritime customers that currently do not exist –** The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot

1627-5 cont'd 6. Purpose and Need
1627-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1627-7 16. LCA Inputs and Assumptions - Hydraulic Fracturing

legitimately claim such credit. They also have no ability to bunker additional ships, since lead agency City of Tacoma states that barge bunkering is prohibited at the TOTE dock and on the Hylebos waterway, and they state that fueling ships other that TOTE vessels is prohibited at the TOTE dock.

- **Questionable Methane Slippage Rates for TOTE Vessels –** It appears that you are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells**– Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis.

Thank you for considering these comments.

Sincerely,

Bradley Thompson
2314 S. Ainsworth Ave
Tacoma, WA 98405

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 10:10:17 PM

Dear Puget Sound Clean Air Agency,

In this comment, I would like to address the lack of GHG analysis or discussion of such in the DSEIS on gas liquids produced when fracking for methane.

The fracking wells in British Columbia produce a large amount of gas liquids as a by-product of fracking. Within the Montney Basin, which includes areas near Fort St. John, Dawson Creek and Chetwynd, the favored drilling sites are those containing large amounts of naturally occurring “wet” gas liquids, as opposed to “dry” conventional natural gas or methane. The most important of those liquids are pentane and condensate, which are used to dilute Albertan oilsands bitumen or heavy oil, thus allowing it to flow through pipelines.

We cannot examine the GHG impacts of fracked gas (methane) without equally analyzing the GHG impacts of gas liquids. How do we measure the GHG impact of a product that is essentially enabling the production of oilsands extraction—some of the most carbon-intensive fossil fuel extraction on the face of the planet?

Alberta’s oilsands industry is the top consumer of natural gas in Canada, accounting for one-quarter of the natural gas used. Much of that gas is burned to generate steam that is pumped below ground to “liberate” the thick oil. As oilsands operations expand, more natural gas must be consumed. It is to the industry’s benefit to see lots and lots of natural gas produced from whatever quarter, and of even greater benefit if increased gas production results in a glut of marketable gas, which keeps prices low.

Like all of that Alberta-bound natural gas, the lucrative gas liquids heading to Alberta are used to prop up the province’s heavy oil industry. They are essential in allowing thick, unrefined Alberta oil and bitumen to move through pipelines.

B.C.’s generous trade in natural gas and wet gases carries with it enormous ecological costs, almost all of which are borne by Indigenous and non-Indigenous communities located in the northeast region.

The Tacoma LNG project is lucrative because B.C. fracked fossil gas is currently dirt cheap, something made possible by the trade in gas liquids to Alberta. However, the more we create a long-term market for cheap natural gas and build new fossil fuel infrastructure to support it, the harder it will be to ever transition off of fossil fuels. With only 12 years to avert runaway climate catastrophe, if we incentivize fracked gas from B.C. we’re subsidizing the oilsands extraction industry and guaranteeing our climate’s destruction.

Please account for the cumulative climate impacts of gas liquids from the B.C. fracking wells in the SEIS.

How B.C.’s Gas Giveaway Fuels Alberta’s
Oilsands: https://thetyee.ca/Opinion/2018/08/08/BC-Gas-Giveaway-Alberta-Oilsands/

I also ask that you include the cumulative climate impacts of gas liquids extracted from the

fracked gas at the Tacoma LNG processing plant. Those gas liquids will be stored in tanks on-site, and then sold. Please account for the processing, storage, sale and use of these gas liquids in your SEIS.

Thank you for considering my comment.

Sincerely,

Bradley Thompson, 2314 S Ainsworth Ave, Tacoma, WA 98405

1628-1 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 9:35:39 PM

Dear Puget Sound Clean Air Agency,

In this comment, I would like to ask that the SEIS not only compare LNG to a No Action Alternative, but also discuss other currently available alternatives that would produce significant GHG reductions much greater than LNG. Since the original project proposal in 2014, there has been a sea change both in terms of what we know is needed (e.g., IPCC report says we have 12 years to avert runaway climate catastrophe, IMO sets new maritime decarbonization standards) and what we know is possible (e.g., renewable fuels, battery storage).

First off, we know that TOTE Maritime has been using cleaner-burning Ultra-Low Sulfur Diesel (ULSD) since Feb 1, 2017. The DSEIS needs to use that as the comparison standard to LNG.
http://www.americanfast.com/news/tote-maritime-fuel-surcharge-increase/

You have no doubt received many comments that say that LNG is the only currently available cleaner-burning fuel for ships, which is patently false. With the IMO setting new decarbonization targets, there has been an exponential growth in research and development into zero carbon shipping. Currently available alternatives include: slow steaming, cold ironing (electrical shore power), engine scrubbers, wind propulsion, hydrogen fuel and hydrogen fuel cells, battery/electric, efficiency of ship design, biofuels, etc. Viking Cruises is building a ship that runs on clean zero-emission hydrogen fuel cells, Washington State ferries have rejected LNG in favor of clean battery/electric, and mostly it seems that the solution is some combination of greater efficiency, better design, and decarbonized fuels.

If TOTE continued to burn ULSD for a few more years, it is likely that a true long-term alternative to maritime use of fossil fuels will emerge. A No Action Alternative should not assume continuation of fossil fuels for 30 to 40 years, because the industry will have to transition and adapt as decarbonization targets become more stringent. There needs to be discussion and consideration of this in the SEIS.

The same is true for Puget Sound Energy and the need for peak shaving. First off, the climate is warming and so the need for peak shaving is in doubt. Second, despite population growth in this region, energy demand has remained stable due to conservation and heating efficiency.

Puget Sound Energy says that the LNG storage tank is needed for “peak shaving” when, on the 1 or 2 coldest days per year, gas demand exceeds supply to keep the Fredericksen gas-fired electrical power generating plant running.

But look what’s happening in California. Just a few weeks ago, the California Public Utilities Commission approved four energy storage projects for Pacific Gas & Electric (PG&E) to replace retiring gas generators, including two batteries that would be the largest in the world. The quickly improving economics of lithium-ion batteries are going to seal the coffin on the gas peaker plant industry. Every energy utility should now seriously look at renewable, clean energy plus power storage instead of expensive and dirty fossil fuel powered plants for energy

1629-2 8. No Action Alternative
1629-2 7. SEPA Alternatives
1629-3 18. LCA Inputs and Assumptions - Marine Diesel Oil
1629-4 7. SEPA Alternatives
1629-5 17. LCA Inputs and Assumptions - Peak Shaving

reliability needs.

The SEIS should not compare LNG peak shaving to a No Action Alternative, but needs to discuss the possibility that gas peaking plants are simply no longer needed.

Storage Will Replace 3 California Gas Plants as PG&E Nabs Approval For World's Largest Batteries: https://www.utilitydive.com/news/storage-will-replace-3-california-gas-plants-as-pge-nabs-approval-for-worl/541870/

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

1630-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1630-2 7. SEPA Alternatives
1630-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 7:21:39 PM

Dear Puget Sound Clean Air Agency,

In this comment, I would like to address methane slippage in marine engines.

In reading the draft SEIS, I did not see enough discussion and analysis of methane slippage in marine engines. From what I have read, methane slippage can be significant in marine engines and can almost eliminate any reduction in GHG impact compared to, for example, ultra-low sulfur diesel (ULSD) which is what TOTE ships have been burning since early 2018. These escaped emissions are obviously significant, as methane has a global warming potential which is 86+ times higher over 20 years.

Methane slippage in marine engines depends upon many variables, which I am asking to be fully discussed in the DSEIS. The three most popular engines utilised by LNG-powered ships are: lean-burn, spark-ignited engines operating on the Otto cycle; diesel dual-fuel (DDF) compression-ignited engines, operating like a lean-burn engine on the Otto cycle, but with Diesel cycle injection to ignite the methane/air mixture; and diesel-injected, compression-ignited engines operating with natural gas on the Diesel cycle.

Therefore, there needs to be discussion in the DSEIS about these variables:
* type of ship engine (TOTE Maritime ships, but also the projected, unidentified ships converting to LNG which are currently included in your GHG analysis)
* speed of travel (methane slippage can depend upon speed of vessel and how hard the engine is working, since methane as a fuel is less efficient than diesel)
* route (dual-fuel ships may simply not choose to burn LNG outside of the 200 mile ECA, or may choose to burn diesel in heavy seas)
* in dual-fuel engines, how much diesel is being burned and how often? Some average of this needs to be accounted for in the cumulative GHG analysis.

I ask that you compare and discuss your findings in comparison to the results determined in this recent EU study by Transport & Environment, titled “CNG and LNG for Vehicles and Ships—The Facts”: https://www.transportenvironment.org/sites/te/files/publications/2018_10_TE_CNG_and_LNG_for_vehicles_and_ships_the_facts_EN.pdf

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

1631-1 1. Determination of SEIS Scope - Comparison to FEIS

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 6:11:44 PM

Dear Puget Sound Clean Air Agency,

In this comment, I would like to address project scope discrepancies between the original Tacoma LNG FEIS, clarifications posted online and via email by the lead SEPA agency City of Tacoma, and the draft SEIS which you released. These discrepancies need to be resolved in order to ensure an accurate and thorough analysis of all impacts of this project, and the best way to resolve the discrepancies would be to begin the SEPA process over again in order to address the significant changes that have occurred from the time that the project was first proposed in 2014 through now November 2018.

Some of these discrepancies include:
* The original FEIS is based upon barges being filled with LNG in the Hylebos waterway, which was later scrapped due to shoreline issues. City of Tacoma has stated numerous times, and it is still stated on their website in no uncertain terms, that filling barges with LNG is not permitted at the TOTE dock or at any other dock in Tacoma. And yet, your draft SEIS analysis presumes that barge bunkering of other ships besides TOTE ships will take place. How are these barges being filled up with LNG if there are no docks available to them?
* Your draft SEIS presumes that other ships besides TOTE ships will convert from fuel oil to LNG, and will be fueled by the Tacoma LNG project. To my knowledge, there are no other current marine customers besides TOTE who have indicated that they will convert their ship's engines to LNG. City of Tacoma, again on their current website, clearly states that NO OTHER SHIPS besides TOTE are permitted to fuel up with LNG at the TOTE dock. The FEIS and the City of Tacoma clearly state that only TWO TANKER TRUCKS PER DAY will be filled at the Tacoma LNG site and travel Taylor Way. So in the absence of bunkering barges, and with only 20,000 gallons of LNG permitted to travel Taylor Way per day, how are other ships going to be fueled, and at what location is this taking place? It is presumption and aspiration that other ships will convert to LNG and be fueled by the Tacoma LNG plant, however, accurate GHG analysis needs to be based upon currently known and stated facts.
* Puget Sound Energy's original project proposal includes fueling of trucks and rail cars, and transport of LNG via tanker trucks, barges, and rail tanker cars. The original FEIS only includes some of these impacts, and excludes transport of LNG via rail tanker cars even though it is now likely that this will be permitted by the Department of Transportation as early as May 2019. If the draft SEIS analysis is going to be based on aspirational business models—such as LNG barge bunkering and truck-to-ship LNG bunkering—then I ask that you also include the GHG impacts of potential sales, slippage, and combustion of LNG transported via rail tanker cars in the U.S. The SEIS must also include GHG impacts of potential sales, slippage, and combustion of rail cars using LNG as fuel.

City of Tacoma answers to Frequently Asked Questions: https://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=113653
Liquefied Natural Gas: Coming to a Rail Line Near You?: https://www.sightline.org/2017/03/07/liquefied-natural-gas-coming-to-a-rail-line-near-you/
Transportation of LNG by Rail Keeps Chugging Along: https://www.jdsupra.com/legalnews/transportation-of-lng-by-rail-keeps-63036/

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

1632-1 3. Outside of SEIS Scope

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 4:02:19 PM

Dear Puget Sound Clean Air Agency,

In this comment, I would like to address the Enbridge natural gas pipeline system that delivers natural gas from Northeastern BC to the Washington State border, and the Williams natural gas pipeline system that delivers natural gas from the Washington State border to the Tacoma LNG plant.

In light of the October 9, 2018, natural gas pipeline explosion near Prince George, BC, I request that the Tacoma LNG SEIS address the following questions:

* How old is the Enbridge and Williams gas pipeline infrastructure?
* What is the current condition of the gas pipeline infrastructure?
* What is the current leakage rate of methane throughout the Enbridge gas pipeline and Williams gas pipeline transmission systems (including compressor stations and other pipeline infrastructure)? Has that been calculated into the overall leakage rate of methane resulting from the Tacoma LNG project?
* How have methane leakage rates from Enbridge/Williams transmission pipeline and infrastructure been determined and who validates the accuracy of those figures?
* The British Columbia Assembly of First Nations (BCAFN) Is now calling for a thorough review of all aging pipeline infrastructure in B.C. What is the status of this request, when is this review expected to be completed, and how could the outcomes of this review impact the consistent supply of B.C. gas to the Tacoma LNG project?

http://bcafn.ca/recent-natural-gas-pipeline-rupture-is-a-wake-up-call/

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

1633-1 3. Outside of SEIS Scope

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 3:35:42 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on Puget Sound Energy's Liquefied Natural Gas (LNG) project being built in Tacoma. As stated in the latest IPCC report, your review of the greenhouse gas impacts of the gas used in this project couldn't be more important. Scientists make clear that, to limit global warming to 1.5C and avert runaway climate catastrophe, we cannot allow any new fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

Please include in your analysis the conclusions arrived at in a recent study carried out by UMAS consultancy that looked at European shipping industry and LNG as a marine fuel. Their analysis concluded that transition to LNG would deliver a maximum 6% reduction in ship greenhouse gas emissions by 2050 compared to the replaced diesel. At that rate, the study calls LNG an "expensive distraction" for shipping with little impact on decarbonization efforts.

Investing in LNG, and building the infrastructure in ports to support it, will simply make it harder to achieve the IMO's shipping climate goals. "Europe should back future-proof technologies that would deliver the much greater emissions reductions that will be needed, including port-side charging or liquid hydrogen infrastructure. This means the EU needs to stop mandating LNG infrastructure in European ports."

https://www.transportenvironment.org/publications/lng-marine-fuel-eu

Flaws in the Tacoma LNG draft SEIS underestimate the greenhouse gas potential of the LNG project, and those flaws have been addressed in other public comments. But, even as currently calculated, it assumes at best an approximate 6% GHG reduction as compared to a "do nothing alternative." Building new 40 or 50 year fossil fuel infrastructure to achieve minimal improvements in GHG emissions simply locks us into an incremental path where we will surely miss the window to transition to a decarbonized future and a stable climate.

Thank you for considering my comments.

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405
(206) 601-5442

1635-1 3. Outside of SEIS Scope

From: Bradley Thompson
To: Public Comment
Subject: Public comment on DSEIS, PSE LNG project
Date: Wednesday, November 21, 2018 11:58:52 PM

Dear Puget Sound Clean Air Agency,

I submit the following comments regarding the draft SEIS for the Puget Sound Energy Liquefied Natural Gas project.

As a Registered Nurse, I am acutely aware of the air quality in our city and how that exacerbates respiratory problems for my patients. Recent wildfires, and the fire at the metal scrap yard in the Port, made clear to me that our city and public health department are sorely unprepared to deal with unhealthy air advisories that threaten long-term health of vulnerable adults and especially children. Even though PM2.5 pollution was at seriously unhealthy levels this summer, there were no N95 masks distributed, there were no emergency shelters opened for the homeless, and there were few advisories issued to keep people indoors. Smoke from wildfires and the scrap metal fire came in through the air intake ducts at the hospital that I work at, causing acute respiratory flare ups, nausea, eye and skin irritation, and headaches.

I moved to Tacoma in 2008 and previously experienced no respiratory problems in my life. But not long after I moved here, I started to experience throat irritation, changes in my voice, watery eyes, and eventually non-allergenic rhinitis that continues to this day. After numerous visits to Ear/Nose/Throat specialists, and after numerous diagnostic tests and studies, I am on daily medication and my symptoms are controlled. However, I wonder about the impact on my long term health as a result of choosing to stay here in Tacoma.

Air quality this past week has returned to Unhealthy for Sensitive Groups levels, and yet people are unaware of this. There are no announcements, and I only know this because now I check PM2.5 levels on a daily basis. As a nurse, I know that PM2.5 is about more than just respiratory complications. It is implicated in heart disease, stroke, and even dementia. Like lead, there is no safe level of exposure to PM2.5, but again people are unaware of these facts in Tacoma.

I state this, because you are a Clean Air Agency, and I know that you will receive many comments touting the “clean air” properties of LNG. That would be true if TOTE Maritime was burning diesel while at berth in the Port of Tacoma, but they are not. They are the only two ships in the Port of Tacoma that currently plug into 97% clean electric shore power from TPU. On the other hand, the LNG processing/refining/storage plant will be operating 24/7 in the middle of a busy urban port surrounded by workers and residential neighborhoods. Your agency is well aware of the local pollution emissions anticipated from the LNG project. Air quality will worsen in the areas surrounding the Port of Tacoma as a result of this project.

I beg you not to approve the air permit for Puget Sound Energy’s LNG project. Enough is enough. I am an environmental site steward for a salt marsh in the industrial Port of Tacoma where I organize work parties once per month. I have volunteers who can no longer work there due to problems breathing, respiratory problems, throat burning, skin and eye irritation. I suspect it is because of leaks from the oil refinery next door.

Please don’t exacerbate Tacoma’s air quality problems. Deny the permit to the LNG plant.

Thank you for considering my comments.

Sincerely,

Bradley Thompson
2314 S Ainsworth Ave
Tacoma, WA 98405

2007-1 23. General Support

From: Tim Thompson
To: Joanna Monroe
Cc: Public Comment; Ryan Thompson
Subject: Re: Letter in support of LNG and Tote
Date: Wednesday, November 21, 2018 11:55:57 PM
Attachments: image002.png

Thank You. Happy Thanksgiving!

Sent from my iPhone

On Nov 21, 2018, at 10:17 AM, Joanna Monroe <Joannasmonroe@outlook.com> wrote:

> To whom it may concern,
>
> Attached please find my letter in support of the approval of the LNG project.
>
> Best,
>
> Joanna
>
> Joanna Monroe
> 253-208-2054
> www.consultjsm.com
> <image002.png>
>
> <Letter in support of LNG and Tote.pdf>

2247-1 10. LCA Calculations
2247-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2247-3 10. LCA Calculations
2247-4 13. LCA Inputs and Assumptions - Natural Gas Source
2247-5 11. LCA Inputs and Assumptions - General

From: Diane Tilstra
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 4:52:32 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a conscious elder and a Tacoma activist concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Do the right thing. We do not know how much damage we have done to the environment. Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Diane Tilstra
mdtilstra@aol.com
719 North 3rd St. Apt 302
Tacoma, Washington 98403

2565-1 10. LCA Calculations
2565-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2565-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2565-4 19. LCA Inputs and Assumptions - End Use
2565-5 14. LCA Inputs and Assumptions - Leakage/Slippage
2565-6 13. LCA Inputs and Assumptions - Natural Gas Source

From: Alex Torres
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Saturday, October 27, 2018 9:27:41 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is NOT using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings

show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

In addition, increased marine traffic will negatively impact efforts to improve the condition of our Salish Sea, the home of the orca and many species of sealife.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Alex Torres
wildbeaches@outlook.com
3010 N Highland St
Tacoma, Washington 98407

2565-6 cont'd 13. LCA Inputs and Assumptions - Natural Gas Source
2565-7 14. LCA Inputs and Assumptions - Leakage/Slippage

1788-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 12:14:23 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Alexandra Torres
torres_ae@hotmail.com
98407

1552-1 22. General Opposition
1552-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: Nancy Tosta
To: Public Comment
Subject: Comments on Draft SEIS for the PSE Tacoma LNG Facility
Date: Tuesday, November 20, 2018 9:31:59 PM

Dear PSCAA –

I urge you to consider use of the most recent science as you examine the impacts of the PSE Tacoma LNG Facility in your SEIS on GHG Emissions Life Cycle Analysis. These would be data reported in the 2013 UN IPCC Assessment Report 5 (AR5) that include two sets of values, one with climate carbon feedbacks and one without. I believe the feedback climate carbon feedback data will provide a more complete picture of the true impacts of methane emissions likely to be produced by the PSE LNG facility.

Additionally, given the need to drastically reduce our GHG emissions within the next twelve years if we are to have any hope of reversing the impacts we've caused, I urge you to replace the 100-year methane GWP values with a 20-year methane GWP value.

On behalf of my children and my grandchildren, thank you for doing what you can to generate the most complete and accurate picture of the future with and without this LNG facility.

Best,

Nancy Tosta

Burien, WA

.

1675-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 21, 2018 8:04:21 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Puget Sound Clean Air Agency, Seattle, WA

Re: PSE - LNG Facility Tacoma -- Draft Supplemental Environmental Impact Statement Public Comment

Dear Colleagues:

Thank you for the opportunity to comment on this important matter.

I am outraged at the gall of our elected officials and their handlers as they move us backward in our struggle for cleaner air and water while watching our environment die.

All of the reasons for rejecting claims of a cleaner fuel, more jobs, a boost in our economy and/or cheap transportation costs have been documented precisely at length, and in detail. Fossil fuels are killers from the point of extraction to the end uses to which it is put. Period.

That said, this letter is about my own private hell. When I moved to Tacoma in 2002, the first place I wanted to go was the Mountain. I wasn't disappointed. Glaciers and snow all around Paradise, wildflowers blooming through the snow. We were in coats against the cold. This year, glaciers are in small patches, snow only at the crest, no wildflowers and women running around in halter tops.

I have a "view" apartment, a ring-side seat at a public murder. The Mountain is obscured by a thick, yellow-gray haze seven days a week. The Tideflats are an expanse of belching factories in a basin not equipped to handle the burden. This whole area is dying and our leaders, our "protectors" are making sure it happens fast and final. It's apocalyptic.

I'm demanding that they stop it! Stop the investment in regression. The only way forward is with an investment in renewable sources of energy. (11/21/2018) 8:04 p.m.

Sincerely,

Diane Tourje
pianolady492000@yahoo.com
98405

0816-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

98101-3317 30

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

RECEIVED
OCT 24 2018
Puget Sound
Clean Air Agency

23 OCT 2018 PM 7 L
SEATTLE WA 980

211 Capri Place
Everett WA 98203

SEPA Reviewer-

I am deeply troubled by the inadequacy of PSEs LNG DSEIS. I ask that you reject the document as not having utilized best science in study of the impacts of this facility. I dont believe it begins to even pass the straight face test when addressing green house gas emissions, lifespan, and impacts to the earth/climate/environment.

Please require an evaluation utilizing best science practices of a 20 year life span so we can actually evaluate the true PJT. impacts!

Sincerely, Paula Townsell
211 Capri Pl., Everett, WA 98203

1604-1 22. General Opposition

From: Carolyn Treadway
To: Public Comment
Subject: NO LNG!
Date: Sunday, November 18, 2018 8:22:22 AM

If humans and other species currently on Earth, our only home, are to survive, all remaining fossil fuels must be kept IN THE GROUND. No further extraction of LNG can be allowed. No storage tank in Tacoma will be needed. Ever. IF we are to survive. Stop this madness, NOW!

Carolyn Treadway
Carolyn@PlanetCare.us
Lacey, WA

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 9:46:07 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

This land was stolen and the treaties must be honored. No Fracking! The future will not exist if this continues.

Sincerely,

Carisa Trejo
gcesward@me.com
98258

0600-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Can you tell us what the chance of a gas explosion would be from the pipeline (s) or other transport that would feed the facility? Please give the average chance and the worst case estimate, including the whole transit network from well to facility. What would the chance be of a gas line explosion affecting at least one house? Again, give an average + the tail (worst case extreme). Thank you!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-4746

0601-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

How many people currently live within 15 miles of a fracking well in the USA? What about Canada? How does this project affect the air and water near them? My grandparents + family are from South Dakota where there is so much fracking, and I worry about them. Please study the number of people who live near fracking wells.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Michele Trickey	Email:	mtricke@gmail.com
Address:	515 Summit Ave E Apt 301 Seattle	Phone:	847-274-4746

0602-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

What chemicals do fracking wells release in the air? I have family in South Dakota and I worry that the increased demand from Asia from these projects will increase fracking and the number of wells and my family will be hurt by the increased chemicals. Please study what chemicals the wells release and their effect on public health.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michelle Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle	Phone: 847-274-4746

0603-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

What are the health risks to babies, children, and old people who live in the vicinity of fracking wells? Please consider the water, and air pollution and also the danger from explosions, etc I'm considering having kids and I'm worried about the effect on my kids and other kids. Please study this!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke2@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle	Phone: 847-274-4746

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

How much methane ~~[illegible]~~ would leak from the # of wells needed to supply the facility ~~at~~ when it's operating at full capacity? Please use worst-case estimates.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricte@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle	Phone: 847-274-4746

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Thank you for reading my comment.
I'm really worried about global warming
I got sick and missed two days of work with the
wildfires this ~~Feb~~ August Can you estimate the
full methane emissions of the facility, from fracked well
to final product in Asia, using average + worst case
scenario ~~Feb~~ estimates, and translate that to global
warming impact using the latest estimates of methane's
impact on global warming?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtrickey@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847 274-4746

0606-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Thank you for reading my comment. I work at Amazon and am concerned about the global warming impact of trucks. ~~[illegible]~~ can you please study the global warming effects of all the trucks that will bring water to the fracked gas well that feed this site? Please assume the site is operating at full capacity and use the most updated estimates for methane emissions impact on global warming.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847 274-4746

0607-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

How does the presence of a refinery on tide flats affect the ability of the flats to clean air and water & and fix carbon? Can you give average and worst-case estimates? I grew up on wetlands and really care about the contribution of land health to clean air + water

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-4746

0608-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

How many people fish in the area affected by the facility?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michelle Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-4746

0609-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

What animals die if there is methanol in a river? In the ocean? Can you assess this for lots of levels of methanol (like 1 ppm, 10 ppm, 120 ppm, 1000 ppm etc.)? I'm so tired of the salmon + orcas dying. It makes me sad.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michelle Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-476

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2109

2109-1 3. Outside of SEIS Scope

How does the presence of a refinery on tide flats affect the ability of the flats to clean air and water & and fix carbon? Can you give average and worst-case estimates?

I grew up on wetlands and really care about the contribution of land health to clean air + water.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-4746

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2110-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Thank you for reading my comment. I work at Amazon and am concerned about the global warming impact of trucks. ~~to~~ Can you please study the global warming ~~ea~~ effects of all the trucks that will bring water to the fracked gas well that feed this site? Please assume the site is operating at full capacity and use the most updated estimates for methane emissions impact on global warming.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Michele Trickey	**Email:**	mtricke@gmail.com
Address:	515 Summit Ave E Apt 301 Seattle WA	**Phone:**	847-274-4746

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2111-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Thank you for reading my comment.

I'm really worried about global warming. I got sick and missed two days of work with the wildfires this August. Can you estimate the full methane emissions of the facility, from fracked well to final product in Asia, using average + worst case scenario estimates, and translate that to global warming impact using the latest estimates of methane's impact on global warming?

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Michele Trickey	Email:	mtricke@gmail.com
Address:	515 Summit Ave E Apt 301 Seattle WA	Phone:	847 274-4746

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2112-1 14. LCA Inputs and Assumptions - Leakage/Slippage

How much methane ~~to/from~~ would leak from the # of wells needed to supply the facility ~~at~~ when it's operating at full capacity? Please use worst-case estimates.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Michele Trickey	**Email:**	mtricke@gmail.com
Address:	515 Summit Ave E Apt 301 Seattle	**Phone:**	847-274-4746

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2113-1 3. Outside of SEIS Scope

~~W~~ What are the health risks to babies, children, and old people ~~from the ocean~~ who live in the vicinity of fracking wells? Please consider the water, ~~air~~ and air pollution and also the danger from explosions, etc ~~Please~~ I'm considering having kids and I'm worried about the effect on my kids and other kids. Please study ~~the~~ this!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	**Email:** mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle	**Phone:** 847-274-4746

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2114-1 3. Outside of SEIS Scope

What chemicals do fracking wells release in the air?
I have family in South Dakota and I worry that the increased demand from Asia from these projects will increase fracking and the number of wells and my family will be hurt by the increased chemicals. Please study what chemicals the wells release and their effect on public health.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle	Phone: 847-274-4746

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2115-1 3. Outside of SEIS Scope

How many people currently live within 15 miles of a fracking well in the USA? What about Canada? How does this project affect the air and water near them? My grandparents + family are from South Dakota where there is so much fracking, and I worry about them. Please study the number of people who live near fracking wells.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name:	Michele Trickey	**Email:**	mtricke@gmail.com
Address:	515 Summit Ave E Apt 301 Seattle	**Phone:**	847-274-4746

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2116-1 3. Outside of SEIS Scope

Can you tell us what the chance of a gas explosion would be from the pipeline (s) or other transport that would feed the facility? Please give the average chance and the worst-case estimate, including the whole transit network from well to facility. What would the chance be of a gas line explosion affecting at least one house? Again, give an average + the tail (worst case extreme). Thank you!

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	**Email:** mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	**Phone:** 847-274-4746

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2177-1 3. Outside of SEIS Scope

What animals die if there is methanol in a river? In the ocean? Can you assess this for lots of levels of methanol (like 1 ppm, 10 ppm, 100 ppm, 1000 ppm etc.)? I'm so tired of the salmon + orcas dying. It makes me sad.

ease include this impact in the Final Supplemental Environmental Impact Statement.

ame: Michelle Trickey
Email: mtricke@gmail.com
ddress: 515 Summit Ave E Apt 301 Seattle WA
Phone: 847-274-476

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2178-1 3. Outside of SEIS Scope

How many people fish in the area affected by the facility?

lease include this impact in the Final Supplemental Environmental Impact Statement.

Name: Michele Trickey	Email: mtricke@gmail.com
Address: 515 Summit Ave E Apt 301 Seattle WA	Phone: 847-274-4746

1518-1 22. General Opposition

From: Michelle Trosper
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:12:08 PM

Name: Michelle Trosper
Email: matrosper@gmail.com
Address: 12219 NE 180th St -
Battle Ground, Washington 98604

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The destruction of Earth and all that live here (including humans) should always be our first concern!

2552-1 22. General Opposition
2552-2 3. Outside of SEIS Scope
2552-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2552-4 14. LCA Inputs and Assumptions - Leakage/Slippage
2552-5 7. SEPA Alternatives

From: Wendy Tsien
To: Public Comment
Subject: Tacoma LNG SEIS Project Public Comment
Date: Wednesday, October 31, 2018 2:08:19 PM

Wendy Tsien
85200 Ridgetop Dr
Eugene, OR 97405

October 31, 2018

Dear Carole J. Cenci,

If we are to have any hope of halting climate change we must immediately stop extracting fossil fuels. Fracking is an environmental nightmare on every front, there is not one good thing to say about it. The enormous mix of chemicals used to break apart underground rock structures pollutes water supplies, the soil, the air, while the fracturing of bedrock causes earth subsidence and earthquakes. Huge quantities of good water are used in fracking, water that we can't afford to throw away on a monstrously polluting industry. Areas where fracking is taking place are suffering appalling damage from the industries' activities: local rivers and streams which once were pristine are now toxic waste sewers, people have lost their drinking water, soils are contaminated by the movement and seepage of heavily polluted water pumped up from the fracking process and can no longer be used to grow food, air quality is awful, and many people are suffering severe health problems from living near fracking sites. Also, the high levels of methane released into the atmosphere by the fracking process ensures that the possibility of reigning in climate chaos becomes virtually impossible.

The fracking and fossil fuel industries spend huge sums of money on PR in order to make it seem as though everything they are doing and want to do is utterly benign, which is a criminal lie, and they know it, but they don't care because they are infinitely greedy for money and power. Our planet cannot survive behavior like this. If we are to have a planet on which we, our children and grandchildren and their descendants can live healthy lives in a healthy environment, fracking and the extraction of fossil fuels must stop immediately.

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

2552-6 7. SEPA Alternatives

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405-12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

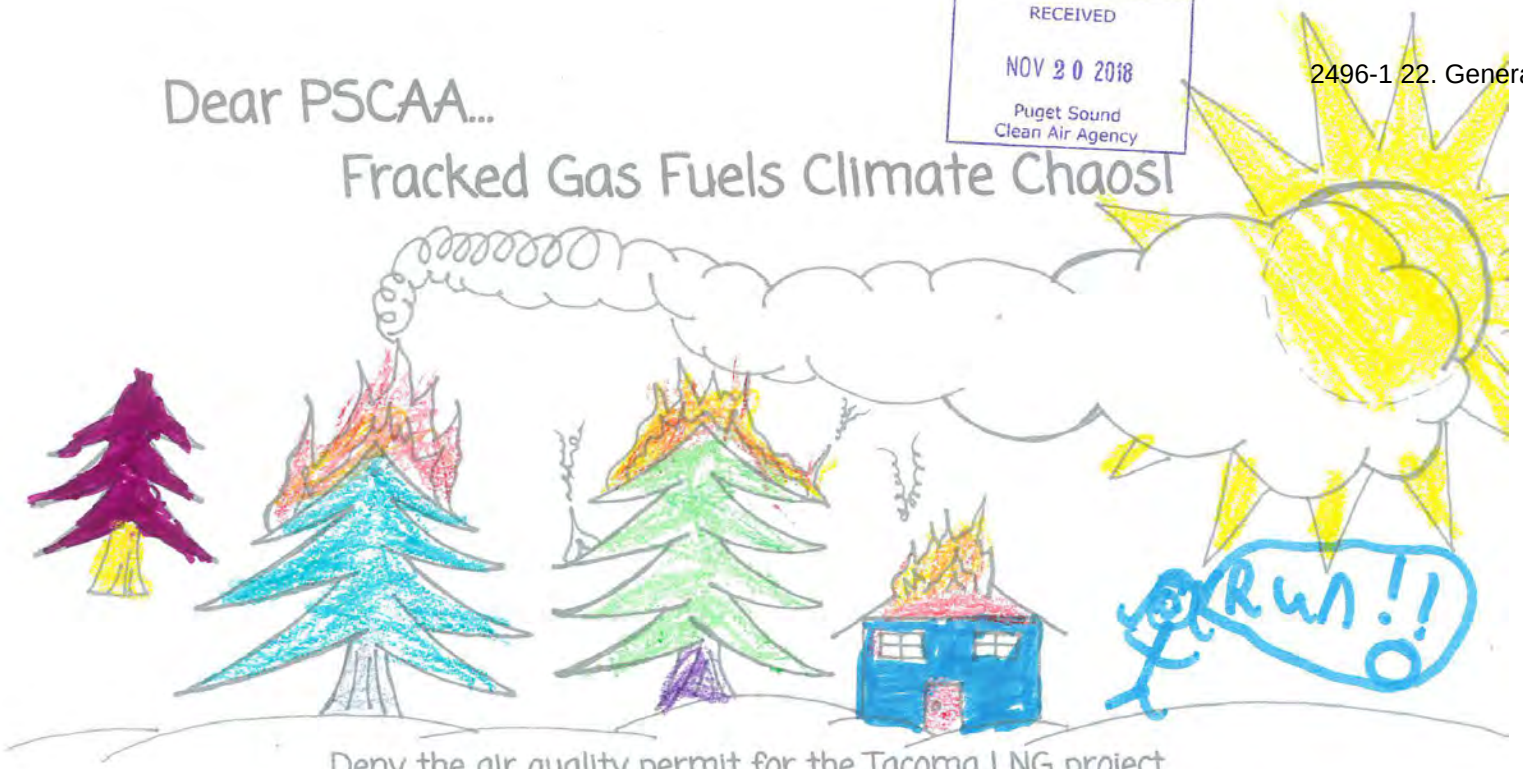
Sincerely,
Wendy Tsien

2496-1 22. General Opposition

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NOV 20 2018
Puget Sound
Clean Air Agency

Dear PSCAA...

Fracked Gas Fuels Climate Chaos!



Deny the air quality permit for the Tacoma LNG project.
When accounting for methane leaks during extraction, transport & storage, "natural" gas is potentially as bad for the climate as coal.

Name Olivia Tucker Age 9

Unknown: **[Inaudible] [06:43:47]**.

Steve: Okay. One more.

[06:44:00]

Unknown: **[Inaudible]**.

Steve: Yes. We have records of all of that, yeah.

Alma: Alma Tuckiupay. Hello, relatives. It's nice to see each and every one of you here today. I just wanted to say that I stand here with my brothers and sisters from our Puyallup Tribe, our **[Native language]**. I know Carolyn went home earlier. And I was hoping that there would be a Puyallup tribal member that would come up here because I'm not Puyallup, but I am enrolled over in Black River Falls, Wisconsin. And we have these fights, these stand ins, these stand ups all over Turtle Island.

And I speak on behalf of all of the indigenous people that cannot be here tonight and for those that cannot speak for themselves. And I'm talking about the Sam, and I'm talking about the two-legged, the four-legged, the winged.

[06:45:01] Everything that we know that we know is life today, as we know it. It's really important, as an indigenous woman, to stand here also for our missing and murdered indigenous women. As you know, in the draft agenda here, you were saying that you're going to bring in fracked gas from BC. But that fracked gas comes at a cost to our indigenous women. And that's why I wear this hat because I'm standing here and saying no more stolen sisters because the fracked gas facilities brings in man camps. And these man camps prey on our women, on our indigenous women. And I just want to stand here on behalf and say no means no.

Honor life, the life that we've been given. And to deny this permit for PSE because it's not natural.

[06:46:03] It's fossil fuel. It comes from the ground. It's old stuff. It's dirty. It's death upon our people. **[Native language]** all of my relations.

Steve: Okay. Thank you. So, I'd like to remind everybody that the comment period on the draft SEIS is open through November 21. So, any comment, even if you've already submitted comments, or you heard something else at the hearing, and you want to submit

1102-1 3. Outside of SEIS Scope

more comments, that's fine. Please submit them to us by the 21st. And the hearing is closed. Thank you.

[End of Audio]

Duration: 407 minutes

1407-1 22. General Opposition
1407-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1407-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Anais Tuepker
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 1:54:15 PM

Name: Anais Tuepker
Email: anais@350pdx.org
Address: 1414 SE Lafayette St -
Portland, Oregon 97202-3846

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Supplemental Environmental Impact Statement (SEIS) submitted for the Tacoma LNG export facility is so severely flawed, in so many different ways, that it would be a serious violation of public responsibilities to accept it as it is.

As it stands, the SEIS does not account for the full climate impacts of the facility, as it is required to do, because of several glaring misapplications of current scientific consensus on data points and appropriate comparisons:
1) It uses Global Warming Potential (GWP) estimates based on 2007 values, not 2016 values - using the more recent numbers would be the appropriate scientific approach and would increase the global warming impact estimate of the project significantly.
2) It looks at long-term (100 year) not near-term (20 year) impacts, which also serves to underestimate the impact, since methane's warming impacts are comparatively more severe over the short-term. Given the latest scientific consensus from the IPCC that the next 12 years will be absolutely critical in determining our ability to avert catastrophic climate impacts, the near-term impacts are the ones to prioritize when evaluating this facility.
3) There are a number of unreasonably favorable assumptions made towards the project in terms of the methane leakage rates during production, none of which are actually justified by current practices or guaranteed to be reflected in the future methane sourcing from fracked gas for this project. The SEIS consistently uses lowest possible estimates of methane leakage based on sourcing from specific sites, but there is no guarantee or even reasonable grounds to assume this will be the case in reality.
4) Throughout, inappropriate and unrealistic comparisons are put forward to make the proposed facility look as if it has a net beneficial impact from displacing more polluting projects. There is no reason to assume this is more likely than that the project would displace more rapid adoption of clean energy alternatives, but including these scenarios as comparisons would make the project look much worse in terms of its impacts. This is obvious cherry-picking of favorable comparison models.

These are only the most glaring scientific reasons the SEIS is unacceptable, but there are broader reasons to deny the project's permissions outright. Equally important objections to the project include the violation of the rights of the Puyallup Tribe, which has consistently opposed this project and whose treaty rights, assured in the highest law of this country, are being violated by this project. The Puyallup people, in opposing this project, are also expressing serious and legitimate concerns about the environmental and health risks that will be foisted upon communities living close to this air and water polluting facility. LNG facilities

have been consistently documented to degrade air quality and emit volatile organic compounds linked to birth defects, cancers, and nervous system damage.

There are many more detailed and obvious reasons to object to accepting this SEIS, but ultimately, even with improved calculations, locking our economy into a project dependent on fracked gas extraction for decades to come cannot be justified at this moment in history when we must urgently transition away from the use of all fossil fuels. The reasonable and most responsible response is to refuse to allow any more time and effort go into the pursuit of this dangerous and dangerously misguided facility.

1483-1 22. General Opposition
1483-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1483-3 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1483-4 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Dena Turner
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:25:14 PM

Name: Dena Turner
Email: denaturn62@gmail.com
Address: 1122 SE 60th Avenue -
Portland, Oregon 97215

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

The Puget Sound Clean Air Agency should go back to the drawing board

The draft SEIS does not account for the full climate impacts of fracked gas. The analysis is incredibly flawed and unacceptable, and we need the Air Agency to do better before they decide on the air permit for the facility. The draft SEIS uses an outdated methane global warming potential (GWP) value.

GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO2). CO2 has a GWP value of 1. Methane has a much larger GWP value, especially over the short term. The draft SE IS uses the United Nations' 2007 value of 25 for the 100 year number (i.e. the methane average GWP over 100 years), whereas they should be using the 2016 value of 32. This single modification in SEIS GHG model makes the LNG plant much dirtier from a greenhouse gas emissions perspective.

Methane is significantly more potent in the near term, yet the SEIS analysis only looks at the long
term impact. Methane is a significantly more potent greenhouse gas than carbon dioxide, especially in the short term. The draft SEIS analysis is based on the 100 year GWP of methane. The IPCC report released a report on October 8th, indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years. Therefore, the SEIS should use the 20
-year numbers, as that is the timeframe where action is needed. It is ridiculous to look out to 100 years, considering that the planet will already have dire problems in 22 years.

The draft SEIS incorrectly assumes that B.C. fracked gas would result in a significant GHG emission reduction. The reports used to justify such conclusion were models or self reported by industry. The three B.C. based reports all require further analysis to determine if they can even be extrapolated to B.C.

Additionally, the SEIS fails to incorporate methane leakage data from recent 2017 and 2018 reports
that use empirical, independent physical studies at well sites. The 2018 report found that 85 percent of active wells are directly venting methane daily, and that those leakages have been historically underreported. The same report found that methane emissions in BC are 2.5 times higher than reported.

The draft claims that all of the natural gas will be coming to the facility from British Columbia.
During the recent natural gas pipeline explosion in B.C. on October 10th, it is our understanding that PSE was able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. PSE's own 2017 10K filing with the Securities and Exchange Commission (SEC) shows that in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%). How will the Air Agency hold PSE
accountable to bringing in only B.C. gas?

Turn down The Tacoma fracked LNG plant in the tideflats of Tacoma. There are too many problems in the claims reported in the SEIS. The earth cannot tolerate more fossil fuel infrastructure and more fossil fuel production, particularly when the SEIS is using faulty data.

The Puget Sound Clean Air Agency should act as its name suggests, and work for sound clean air policies, and work against the Tacoma fracked LNG plant.

Sincerely,
Dena Turner

0945-1 3. Outside of SEIS Scope
0945-2 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0945-3 3. Outside of SEIS Scope
0945-4 11. LCA Inputs and Assumptions - General
0945-5 13. LCA Inputs and Assumptions - Natural Gas Source

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Washington's Puget Sound Orca population is seriously endangered by noise on the waterways, decreasing fish stocks, pollution, and acidified water. The DSEIS needs to account for how the proposed LNG facility emissions, noise, and extra traffic be considered neutral or helpful to the Puget Sound ecosystem?

Submitted by Caryl Utigard 2447 SW 170th St. Burien, Wa. 98166 206 439 9747

Caryl Utigard

PSE has mixed the emission data of fracked and non-fracked gas. Since already our gas is 2/3 fracked and increasing, I want the emission figures updated to show both the present and future percent fracked gas figures for the life of the plant used in figuring the emission data. Caryl Utigard

Submitted by Caryl Utigard 2247 SW 170th St. Burien,Wa. 98166 206 439 9747

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I don't see any report in the DSEIS of how much water will be used at the proposed LNG site nor where the water will be drawn or expelled. Thus, I request that PSE report on the water use and disposal that will be required on site and upstream at the fracking site. Further, the emissions resulting from hauling the water, chemicals and other site materials to and from the site must be added into the emission total. Caryl Utigard

Submitted by Caryl Utigard 2447 SW 170th St. Burien, Wa. 98166 206 439 9747

If PSE plans to use BC gas, which is 100% fracked, then the procedures they used to obtain lower emissions than using US gas are suspect. I am asking an independent PSCAA chosen firm to monitor the emissions. How can PSE guarantee that for the life of the proposed Tacoma LNG plant all the gas will come from the sources tested for purposes of this DSEIS?

Submitted by Caryl Utigard 2247 SW 170th St. Burien, Wa. 98166 206 439 9747

Caryl Utigard

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Clean Air Agency

The DSEIS does not compare the economic damage to the Puget Sound area of investing millions of dollars in a globally detrimental old nonrenewable energy source just when the technology of the future to produce renewable energy is available and increasingly not only lower in cost, but not environmentally dangerous or destructive. I am requesting that the Puget Sound Clean Air Agency look at the basic health (air particulates, water pollution) of Puget Sound under the scenarios of LNG vs no LNG . Caryl Utigard

Submitted by Caryl Utigard 2447 SW 170th St. Burien, Wa.98166 206 439 9747

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Clean Air Agency

The DSEIS submitted by PSE is lacking accurate estimates of the hazards of building, using and maintaining the pipes and site and distribution of product. Thus, I am requesting that PSE submit a list and description of all of their explosions, leaks, unintentional emissions and the area this covers for the past 20 years as a way to estimate part of the future problems this proposed LNG plant may experience. To this data must then be added the hazard of the new mix of fracked gas, the new size of the storage facility, the new acreage of pipes proposed, the new noxious chemicals to be added at site, the site stability difference and elevation and geological fault situation. These data in total should form the estimate of air and water hazard from the LNG proposed facility vs not building the facility. Caryl Utigard

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Clean Air Agency

Submitted by Caryl Utigard 2447 SW 170th St. Burien, Wa. 98166 206 439 9747

PSE used 100 year estimates of warming in their data. I'm requesting PSE rerun the data of emissions and leakage using current (2016 or later) figures for a 20 year interval as 2018 UN climate data suggests that our planet needs us to bend down the earth warming pollutants within the next 10-12 years to keep the earth livable. Caryl Utigard

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NOV 15 2018
Puget Sound
Clean Air Agency

Submitted by Caryl Utigard 2247 SW 170th St. Burien,Wa. 98166 206 439 9747

0945-6 3. Outside of SEIS Scope
0945-7 3. Outside of SEIS Scope
0945-8 12. LCA Inputs and Assumptions - Global Warming Potential Value

0945-9 14. LCA Inputs and Assumptions - Leakage/Slippage
0945-10 18. LCA Inputs and Assumptions - Marine Diesel Oil

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The DSEIS submitted by PSE is lacking accurate estimates of the GHG emissions .

PSE used outdated (2007) instead of (2016) and latter emission figures. As the years pass and the measurements of GHG emissions improve in accuracy the data show substantially more leakage from upstream through downstream and end use. Thus, I request that the leakage data submitted be updated using the 2016, the most recent UN data, or more recent published scientific data.

Caryl Utigard

Submitted by Caryl Utigard 2247 SW 170th St. Burien,Wa. 98166 206 439 9747

Caryl Utigard

Submitted by Caryl Utigard 2247 SW170th St. Burien, Wa. 98166 206 439 9747

Since LNG is only half as energy dense as marine HFO, I want the figures to reflect the GHG emissions to reflect the need to produce and burn twice the fuel to maintain the current level of work produced by existing fuel sources .

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[05:21:00]

Chuck: Chuck Valdez, yeah, that's my tax number name. My Native name is **[Speaking native language]**. I'm Apache, and I'm Northern European. I'm also a citizen here in Tacoma, a new arrival. I came from the LA Riverside area in Southern California. The air was unbreathable down there. I have asthma. I dealt with it all of my life. I don't want to see this community become like LA or Ferguson or any of the other fossil fuel polluted communities across our whole nation. And I heard TOTE and the executives and the people that work for them about emissions and sulfur and the need for LNG.

They're already meeting their requirement. They just don't want to pay. This is about greed. They don't want to pay for ultra-low sulfur diesel.

[05:22:03] LNG is unneeded. They already meet requirements. And air, water, it's all connected. And water is what this LNG facility sits on. It's an estuary. The Asarco's smelter dump is what created the land there. The Puyallup People, which I'm a guest of and everyone in this room is a guest of, they're our hosting tribe. Thank you for letting us be people here in their community. But back to the point, that's built on water. Highly explosive facility built on top of water, on top of a toxic waste dump. Nobody has the deed to that land because it's not land. It's a Asarco smelter dump.

[05:23:00] That's what it sits on. On top of water and pollution. If that thing goes up, it's going to liquify. And everything around it is going to explode, too. Fourteen or is it seventeen, I don't know how many people are going to be in charge of this plant. They're in charge of thousands of lives, 14 to 17 people in charge of the Hilltop, the Puyallup Reservation, the whole blast zone area. They're pretty much, literally, in charge of all of those lives, 17 people for greed. And I've gone past my time. Thank you for hearing my voice.

1474-1 3. Outside of SEIS Scope

From: Rebecca VanderMalle
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 8:41:16 PM

Name: Rebecca VanderMalle
Email: rvandermalle@gmail.com
Address: 1298 Oak Dr. -
Eugene, Oregon 97404

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Whoever is thinking of fracking in WA or OR has no idea of the risk of this horrible idea. The Cascadia Subduction Zone is a 600-mile fault that runs from northern California up to British Columbia and is about 70-100 miles off the Pacific coast shoreline. ... The last earthquake that occurred in this fault was on January 26, 1700, with an estimated 9.0 magnitude. This could cause so much damage to these states that would cost FEMA enormous amounts of money. This idea is foolish, reckless and should be stopped immediately!

Oregon Office of Emergency Management : Cascadia Subduction Zone
https://www.oregon.gov/oem/hazardsprep/Pages/Cascadia-Subduction-Zone.aspx

2243-1 10. LCA Calculations
2243-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2243-3 10. LCA Calculations
2243-4 13. LCA Inputs and Assumptions - Natural Gas Source
2243-5 11. LCA Inputs and Assumptions - General

From: Joy Vartanian
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Saturday, November 17, 2018 7:50:02 AM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Fox Island resident concerned about climate change and our contributions to global warming. What happens in Tacoma doesn't stay in Tacoma: Fox Island has soil contamination from the Aramco Lead Smelter.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Joy Vartanian
equus05@yahoo.com
PO Box 537
Fox Island, Washington 98333

0823-1 23. General Support

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

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Clean Air Agency

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Juan Vasquez

Address or email JCV84@yahoo.com

I am all for the Clean Air project. Who wouldnt Want Clean Air to breathe in? the Present and the future Need Clean Air. I Hope to See that in the future my Kids wont have to worry about these type of Situations.

1950-1 23. General Support

From: Terry Velasco
To: Public Comment
Cc: Alex Hofeling; Tyler Edgar; Grace Greene; Anissa Stella; Lisa Simmons
Subject: Attn: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 6, 2018 1:47:44 AM

Hello. My name is Terry Velasco.

It is important for you to hear from someone like myself, who not only has lived in the NE Tacoma neighborhood (actually 6 minutes from the LNG facility) for over 36 years, but also has worked at TOTE Maritime for more than 21 years.

As you are aware, TOTE plans to switch from burning diesel bunker to using LNG to fuel our vessels. This is yet another opportunity my company is taking to improve our environment. Years ago, we installed Rain Gardens in our Terminal to filter the contaminates out of the storm water before it ran into Commencement Bay. We also were the first, and still the only, large shipping company in the Port to install Shorepower capability, which allows our vessels to sail into port and turn off our engines by plugging into power at the dock. For those 8+ hours, our ships emit nearly 0 emissions. That's at least 8 hours twice a week, 52 weeks a year we are reducing the release of pollutants into the air.
It stands to reason that now TOTE is taking even more steps to further reduce emissions.

My family and I greatly appreciate this and all TOTE is doing to provide a cleaner environment for our future.
Many, if not all of us, living in this area use gas in our daily lives. We need LNG to reduce our dependency on dirty diesel fuel.
Please approve this permit.
Thank you for listening.
Sincerely,
Terry Velasco

Terry Velasco | Senior Business Analyst | **TOTE Maritime Alaska**
500 Alexander Ave E, Tacoma, WA 98421 | O: 253.238-8432 | www.totemaritime.com

0366-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Teri Vasquez

Address or email terivelasquez@gmail.com

I'm against fracking anyway as their are better ways to provide energy that is ecologically ~~the~~ sane. I secondly oppose placing this bldg where it affects the Puyallup Tribe.

1269-1 17. LCA Inputs and Assumptions - Peak Shaving
1269-2 17. LCA Inputs and Assumptions - Peak Shaving
1269-3 17. LCA Inputs and Assumptions - Peak Shaving
1269-4 17. LCA Inputs and Assumptions - Peak Shaving

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG
Date: Tuesday, November 20, 2018 10:21:34 PM

Dear Puget Sound Clean Air Agency,

I am concerned about the peak-shaving aspect of the Puget Sound Energy LNG project. I read in the final EIS that it was supposed to be additional gas for home heating in the area on the coldest days of the year. According to PSE, this was only "for a few days that may only occur once every few winters." [01. UG-151663 PSE_PUBLIC Garratt direct (R) PSE 2015.08.11 page 10 of 51]. But now in this draft SEIS the gas from the LNG facility is supposedly going to be used on the Frederickson gas-fired power plant. It seems to me that they decided to "cherry-pick" this facility to say the gas would be used to displace the use of diesel and therefore afford greater alleged greenhouse gas reductions (at least under these rosy assumptions) rather than just being used in homes as usual.

Why is the LNG for use in peak shaving suddenly supposed to be used in Frederickson?

This seems suspicious to me and matches the pattern of PSE telling different stories to different audiences I have seen since following this project for the last two years.

How much diesel does the Frederickson power plant actually use? I would like to see data showing how much diesel the Frederickson power plant has used over its years of operation.

Furthermore, I would like to know why the PSE LNG facility will only be used for peak-shaving for 10 years? Where does this 10-year timespan come from?

Thank you for doing this review in the first place and considering my comments.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1270-1 13. LCA Inputs and Assumptions - Natural Gas Source
1270-2 13. LCA Inputs and Assumptions - Natural Gas Source
1270-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 10:23:23 PM

Dear Puget Sound Clean Air Agency,

When I first started looking into Puget Sound Energy's Liquefied Natural Gas project, PSE always claimed they had no control over where there gas comes from or if it was from fracking. Their go-to response was "we buy our gas on the open market". Finally we saw from their Securities and Exchange filings that they get their gas from British Columbia, Alberta and the US (some 26%). As soon as the PSCAA SEIS was announced, the information on their website suddenly changed to say they get all their gas from BC. My understanding is that these gas supplies are in multi-year contracts.

I would like to see the current gas-supply contracts that PSE has and until what year they endure.

If PSE fails to maintain a purely BC gas supply, will they then be operating outside of their permit? What will be the consequences?

What happens when the leakage rates in BC are found to be higher than currently modeled?

Thank you for reviewing this unnecessary refinery.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1271-1 7. SEPA Alternatives

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 10:30:10 PM

Dear Puget Sound Clean Air Agency,

I hear all these claims about the Puget Sound Energy Liquefied Natural Gas project cleaning our air here in Tacoma. I would really like to see that backed up by data since the two TOTE ships are the only ones that actually plug into shore power when they dock.

Could you show me a side-by-side comparison of the yearly emissions emitted by:

-the two TOTE ships coming and going in to port (say within 3 miles of the dock?) once a week each and plugging in to shore power

-the LNG facility running non-stop and emitting various chemicals into the city of Tacoma plus the two TOTE ships burning whatever combination of diesel and LNG to get in and out once a week each after being on shore power (using a 3 mile distance again).

I think this would be an interesting comparison.

For a better tomorrow,

Dan

Sent from Windows Mail

1272-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1272-2 9. LCA Methodology

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 11:05:21 PM

Dear Puget Sound Clean Air Agency,

As I write this email my IQAir phone application tells me that the Air Quality Index (AQI) of Tacoma is currently 98. It was at a similar level around 11am when I biked downtown and felt I had to hold my breath. When I later emerged on Pacific Avenue it reeked of port emissions. Our air quality has been horrible lately and I don't believe the Puget Sound Energy Liquefied Natural Gas refinery will help that.

The stated greenhouse gas benefits, using the old scientific potency value of methane over 100 years, are a meager 3.9-5.5%. In Europe they came to similar numbers, not even taking into account upstream methane emissions, and discounted LNG completely as being a viable shipping alternative to current fuels.

In the draft SEIS there are many places where some contributions to greenhouse gas emissions are considered to be 0% because they are less than 1%. Given the slim margin of alleged improvement, I don't think these sources should be so easily dismissed – obviously several small numbers can combine to a more significant figure.

Therefore, I would like all quantities assigned a 0% contribution in the draft SEIS assigned an actual value using best available science and the sum of those values added into the overall figures.

Also, why has the CO2 emission figure for the refinery jumped from 21,000 tons per year to 52,000 tons per year (at 250,000 gallons/day production)?

Thank for your taking into consideration my comments and I look forward to seeing them answered.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1273-1 15. LCA Inputs and Assumptions - Natural Gas Properties
1273-2 3. Outside of SEIS Scope

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 11:10:17 PM

Dear Puget Sound Clean Air Agency,

Since Puget Sound Energy claims they will be getting all of their methane from British Columbia now, I think there are some other carbon sources that are not taken into account:

- The fracking wells in BC are considered quite "wet" in that large quantities of liquid hydrocarbons come out with the "natural" gas. **These wet hydrocarbons should be figured into the greenhouse gas impacts as well. How many tons of liquid hydrocarbons are collected from the wells in BC per year? What is their GHG effect?**
- In British Columbia the gas industry cuts so-called "seismic lines" through the forests. Once they find a viable location they then feel more trees. **All the trees cut down by the natural gas industry need to be accounted for in this study. How many trees are cleared by the natural gas industry annually and what is the overall trend?**

Thank you for reviewing this project.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1274-1 1. Determination of SEIS Scope - Comparison to FEIS

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG
Date: Tuesday, November 20, 2018 11:22:55 PM

Dear Puget Sound Clean Air Agency,

I noticed that the scope of services that PSE claims to provide in this draft SEIS is wider than those outlined in their final EIS for the project. For example, in your draft SEIS, PSE claims to have additional maritime customers for their LNG. The City of Tacoma, as the lead SEPA agency, has categorically denied that PSE plans to or will be allowed to any ships aside from the two TOTE vessels. They have even said that the refueling connections are unique to those ships alone and therefore can't be used by other ships (not that there are many – only 120 or so of the 100,000 cargo vessels in the world are built, or being built, to burn LNG).

How can PSE claim emissions credits for customers it does not and allegedly cannot have? Any references or calculations involving supplying non-TOTE vessels with LNG should be struck from the study.

If PSE has misled the City of Tacoma and in fact does wish to supply other maritime customers, how long would it take them to secure the additional permits they need to then start bunkering other ships?

I look forward to reading a correction and clarification on this matter.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1275-1 5. Regulatory Framework

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG
Date: Tuesday, November 20, 2018 11:30:36 PM

Dear Puget Sound Clean Air Agency,

After seeing the draft SEIS you presented to us, the public, I am deeply confused about your role in this review process.

Could you please explain it to me?

What led to my confusion was the fact that this draft SEIS was so not complete. How can we comment on something that is not complete? Do you have experts of your own that reviewed the draft SEIS and asked for clarifications from Environment and Ecology, the firm that wrote it? That doesn't appear to be the case.

And what about all the questions that we ask? My understanding is that you compile them and then present them to the SEIS preparer, Environment and Ecology. But what happens when those answers come back? Do you evaluate them for completeness and scientific soundness? This is the part that worries me deeply.

I look forward to your response.

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1276-1 11. LCA Inputs and Assumptions - General

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 11:44:37 PM

Dear Puget Sound Clean Air Agency,

In the draft SEIS I read that “many existing [LNG] plants have been running for more than 40 years.”

I would like to see an itemized list of these facilities including their names, location, years in operation, storage capacity, production capacity and type of facility (refinery, traditional peak-shaver, maritime fueling station, etc.).

So what this report is saying is that it’s not really planned to be a so-called “bridge fuel” to renewables, but a decades long commitment to continuing to burn fossil fuels in the face of the recent Intergovernmental Panel on Climate Change.

Thanks for considering my comments.

For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1277-1 7. SEPA Alternatives
1277-2 17. LCA Inputs and Assumptions - Peak Shaving

From: darovi2003@yahoo.com
To: Public Comment
Subject: Draft SEIS on PSE LNG Refinery
Date: Tuesday, November 20, 2018 11:59:26 PM

Dear Puget Sound Clean Air Agency,

In your draft SEIS you compare LNG to a no-action alternative. But that seems like a false choice.

What if that money had instead been invested in shore power for ships in the Port of Tacoma? How many tons of CO2 would be eliminated per year through that action? That would also have reduced local air pollution without adding a refinery which only spews more toxins into our environment.

Instead of comparing the peak shaving function of the facility to burning diesel at the Frederickson gas-fired power plant (how likely is that anyway?), why not compare it to the green alternative of lithium ion battery bank storage such as is being built in California and already deployed in Australia?
For a better tomorrow,

Daniel Villa
1217 S 9th St
Tacoma, WA 98405

Sent from Windows Mail

1323-2 3. Outside of SEIS Scope
1323-2 22. General Opposition

From: +14256470285@tmomail.net
To: Public Comment
Date: Sunday, November 18, 2018 7:43:20 PM
Attachments: text_1542575527015.txt

Please consider all the negative aspects of the PSE LNG project! It imports fracked gas via a pipeline and stores it in a tank. Fracked gas is ecologically unsustainable, it pollutes. Pipelines leak, explode and pollute. Tanks leak and can explode. We need clean air and water. Please recommend that the project be stopped! Our future depends on it. Thank you, Pat Villa

T··Mobile·
This message was sent to you by a T-Mobile wireless phone.

1724-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Monday, November 19, 2018 9:19:45 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracked gas is not an environmentally sound, sustainable energy source. Considering all aspects of its production and use, it is as polluting as coal.
Please, for the sake of all, stop the PSR LNG project!
Thank you,

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

1738-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 21, 2018 10:41:44 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Please stop the PSE LNG project! It is bad for Tacoma, bad for Washington, bad for Canada! Money is not a good ruler. Protect clean air, land and water - our lives depends on it!!

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

1740-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 1:14:01 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The Clean Air Agency is using an outdated methane global warming potential value – the most up-to-date modeling shows that the LNG plant is dirtier and more climate polluting than the heavy fuel oil currently used.
Please make a decision that supports clean air and a healthy future!

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

1748-1 3. Outside of SEIS Scope

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Friday, November 16, 2018 3:28:10 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

A complete study would surely indicate that adding a fracked gas pipeline and storage facility is not a good choice for this area. Short and long term pollution, health and environmental hazards are certain. Let's be brave and decide on a healthier, cleaner future!!
Thank you,

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

1793-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 20, 2018 2:58:22 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

We have only a few years to radically change our energy sources if we want any hope to avoid catastrophic climate change. Please stop this unnecessary, ill-advised, very polluting PSE LNG project!! Let's be leaders, not heel-draggers, in the effort to do what we can to protect our land, air, water and health.

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

1797-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:28:58 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Fracking is a disaster for the land, air and water! It leads to more pollution, endangering human health. Pipelines break and explode. Please decide against the PDE LNG project. For many reasons it is unsound.

Sincerely,

Pat Villa
padavilla@hotmail.com
98006

2225-1 22. General Opposition

From: Pat Villa
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Friday, November 9, 2018 9:36:07 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma.

We do not need to support more fossil fuel production, much less from fracking. I hope you will take into account the long term negative impacts as well as the potential for catastrophic damage this project entails.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Sincerely,
Pat Villa

Pat Villa
padavilla@hotmail.com
11448 Newcastle Way
Bellevue, Washington 98006

2218-1 22. General Opposition

From: Eric Voboril
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Tuesday, November 20, 2018 6:15:57 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Thank you for reviewing the Puget Sound Energy LNG storage facility being developed in the Port of Tacoma.

I am a opposed to this project for the simple reason that I believe we should not be building large fossil-fuel based projects of of any kind in Tacoma or elsewhere. The United Nations IPCC has been clear that without drastic action to curtail C02 emissions of all kinds, including from the use of natural gas, our planet will start to experience catastrophic weather and natural events due to climate change. In fact if one considers the recent wildfires in California and hurricane events around the world, this future is already on our doorstep. Review of claims by PSE already reveal that this project will not deliver the reductions in emissions promised. Please take a step for future generations, and do not permit this project to go forward.

Thanks
Eric Voboril

Eric Voboril
ewvoboril@gmail.com
PO Box 18116
Tacoma, Washington 98419

1557-1 7. SEPA Alternatives
1557-2 21. LCA Inputs and Assumptions - Additional Air Pollutants
1557-3 14. LCA Inputs and Assumptions - Leakage/Slippage

From: Rich Voget
To: Public Comment
Subject: Deny the PSE LNG project
Date: Tuesday, November 13, 2018 2:29:32 PM

I attended your public hearing on October 30th at the Rialto Theater in Tacoma. After listening to all the arguments for and against, here is my summation:

Air quality coming from ships will be greatly improved by switching from bunker fuel to liquefied natural gas (LNG). If you just focus on switching from a dirty fuel to a fuel with no particulates, then it would be an easy decision to approve the project. But the issue of poor air quality from ships is currently being addressed. Scrubbers are available that can remove more than 99% of the sulfur from the exhaust gas. The European and North American emissions control areas (ECAs) already have a .10% sulfur cap on marine fuel that will be lowered in 2020. Alternative cleaner fuels such as hydrogen fuel cells and biodiesel are currently available. Electric engines for ships will be available eventually.

You are charged with protecting the air quality from pollution from all sources, not just ships. Refining and liquefying natural gas to make LNG produces tons of pollutants. Literally tons! Here are annual pollution estimates from the Environmental Impact Statement (EIS) that were submitted to the City of Tacoma

NOX 13.8 tons per year

CO 20.1 tons per year

SO2 5.5 tons per year

PM10 1.03 tons per year

PM2.5 1.03 tons per year

Sulphuric Acid 0.27 tons per year

Greenhouse Gases 20,751 tons per year

VOCs 85.7 tons per year Those Volatile Organic Compounds have even more serious impacts at high levels of exposure. Short-term effects include eye, nose & throat irritation, headaches, nausea/vomiting, and dizziness. Long- term, high-level exposure can cause liver and kidney damage, central nervous system damage, and cancer.

The greatest threat coming from the PSE LNG facility is from the potent climate warming greenhouse gas, methane that will be leaking from the well head to its final combustion. Both the quantity and climate warming potency need to be considered. Our civilization needs to start quickly reducing its use of fossil fuels if we are to have a healthy climate for future generations. My greatest concern is that, if approved, the PSE LNG facility would be operational for 40 years to directly contribute to climate change.

Locking us into 40 years of preventable greenhouse gas emissions in order to eliminate particulate emissions from shipping is a poor choice when there are other ways to accomplish that without endangering the climate. Maybe it will be up to 10 years before those other ways

are completely available. That is a small price to pay instead of locking us into 40 years of preventable greenhouse gas emissions. It is just that shipping companies don't want to spend the money to invest in other clean alternatives when cheap LNG is available. Making society pay for the damages and deaths caused by climate change so shipping companies can save money today is an immoral choice. Please deny Puget Sound Energy from operating the Tacoma LNG facility.

Sincerely,

Richard Voget

1615 N 41st St.

Seattle WA 98103

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

Please study all the contaminants left in the air, water and land caused by the fracking process and how those carcinogens and neurotoxins affect people who live within a mile of the fracked well. Then calculate how many people will be affected in order to supply natural gas for the expected life of the facility.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Richard Voget	Email: rvoget@w-link.net
Address: 1615 N 41st Seattle WA 98103	Phone: 206 478 1728

0578

0578-1 3. Outside of SEIS Scope

0579-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please focus on the added environmental impacts of the proposals at hand without assuming they will displace other diesel fuels

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Richard Voget	Email: rvoget@w-link.net
Address: 1615 N 41st Seattle WA 98103	Phone: 206 478 1728

0580-1 22. General Opposition

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

Please study the environmental impacts of the proposed project when it is running at full capacity as the opposed to the fossil fuel companies stating that after building the facility, it will only run at a fraction of this capacity. This makes no economic sense and these companies strive to maximize their profits. Therefore look at the amount of contaminants produced by the facility working at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Richard Voget	Email: rvoget@w-link.net
Address: 1615 N 41st Seattle WA 98103	Phone: 206 478 1728

1208-1 22. General Opposition

Carole: Thank you, Mr. Johnson. Rich Voget?

Rich: This is the wrong facility in the wrong place. It's wrong geologically to build an LNG refinery whose tank holds the equivalent of 166 kilotons of TNT in an earthquake and tsunami zone just above sea level on unstable fill next to two superfund sites. Gee, what could go wrong? It's in the wrong place for the Port of Tacoma's business to have LNG bunkering at their busy port because other ships pose an ignition risk to LNG bunkering.

[00:08:00] During ship to ship bunkering, both the supply vessel and receiving vessel pose an ignition risk. To control the risk presented by other marine traffic, bunkering operations require a geographic safety perimeter that excludes other vessels and limits the speed and possibly the size of passing ships. Precautionary safety restrictions would most likely limit ship traffic to and from other businesses on two port waterways and could likely impair normal operations of unrelated port business activity. The LNG facility is in the wrong place, from an air pollution standpoint.

The residents of Tacoma will get to breathe a potpourri of nitrous oxides, sulfuric acid, and fine particulates and experience adverse health impacts ranging from asthma to emphasema.

[00:09:00] It's estimated that 85.7 tons per year of volatile organic compounds will be emitted from the facility. Short term effects of volatile organic compounds include eye, nose, and throat irritation, headaches, nausea, vomiting, dizziness. Long term, high level exposure can cause liver and kidney damage, central nervous system damage, and cancer. What are the health implications, when a freak weather pattern causes air to stagnate for a prolonged period of time? I was in France during the heat wave of 2003. There was no breeze. Thank you.

Dear Port of Tacoma, and Seattle City,

Dear Puget Sound Clean Air Agency,

2136-1 3. Outside of SEIS Scope

Please study the environmental impacts of the proposed project with it running at full capacity as opposed to the fossil fuel companies stating that after building the facility, it will only run at a fraction of their capacity. This makes no economic sense and these companies strive to maximize their profits. Therefore look at the amount of contaminants produced by the facility working at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Richard Voget	Email: rvoget@w-link.net
Address: 1615 N 41st Seattle WA 98103	Phone: 206 478 1728

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2137-1 3. Outside of SEIS Scope

Please focus on the added environmental impacts of the proposals at hand without assuming they will displace other dirtier fuels

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Richard Voget	Email: rvoget@w-link.net
Address: 1615 N 41st Seattle WA 98103	Phone: 206 478 1728

ear Port of Kalama, and Cowlitz County,
ear Puget Sound Clean Air Agency,

2138-1 3. Outside of SEIS Scope

Please study all the contaminants dept in the air, water and land caused by the fracking process and how those carcinogens and neurotoxins affect people who live within a mile of the fracked well. Then calculate how many people will be affected in order to supply natural gas for the expected life of the facility

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: Richard Voget
Email: rvoget@w-link.net
ddress: 1615 N 41st Seattle WA 98103
Phone: 206 478 1728

Steve: Thank you. Next up is Carlo Voli.

[04:33:00]

Carlo: Hi. I'm Carlo Voli. I live in Edmunds. And my family on my mother's side has been here in Puget Sound Salish Sea area, since the 1870s. And I strongly support the Puyallup Tribe's stands who are opposed to this project. And also, requesting that the draft SEIS be redrawn with accurate and current data, which it obviously isn't, as a lot of other folks have pointed out. Something that hasn't been mentioned here is that not only is the scientific data you've been using incorrect, but this is also an environmental justice and Tribal Nations issue.

And it is kind of interesting that the Puget Sound Clean Air Agency and its advisory council, the two seats that are vacant are exactly those two.

[04:34:00] The Environmental Justice seat and the Tribal Nation seat, in the advisory council for your agency. So, that, to me, is quite concerning because this is, obviously, from an environmental justice issue, not just the impacted communities in Tacoma, with the air quality. But I've heard directly from First Nations up in BC where, supposedly, some of this fracked gas is going to come from, how those Treaty 8 First Nations are being directly impacted with their air and water quality and lack of ability to carry their traditional lifestyles. Plus, in all of the communities in the fracking areas, not just the air and water quality, but also the gender and sexual violence that's involved in all of this.

And I'm not sure if you're taking into account all of the increase in truck traffic in the fracking areas, which also adds a lot of air quality issues.

[04:35:05] So, please, deny this permit. And before doing that, do a proper SEIS evaluation. Thank you.

1784-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 1:22:12 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

I'm tired but won't stop fighting back for my children and future generations.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Shanti Volkmann
shanti@fiveby.com
98144

0457-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I am a grandmother and an environmentalist. I value the beautiful area we are fortunate to live in and the opportunities to recreate and appreciate with my grandsons. Our young people may have to spend their time in filtered rooms with computer images of what was. That leaves me very concerned about green house gases and climate change which is upon us and likely to be the legacy we leave. This DSEIS does not adequately evaluate the effects of the methane on climate change and should be done over – completely.

Please include this in the final supplemental environmental impact statement.

Name: DOROTHY WALKER	Phone: 253.365.6059
Address: 3608 FOREST Beach, GigHarbor	Email: DOROTHYW@CENTURYLINK.NET

1455-1 22. General Opposition

From: Sherry Wade
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, October 30, 2018 5:12:10 PM

Name: Sherry Wade
Email: wadesherry8@gmail.com
Address: 6825 NE 6th Avenue -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Thank you for opening up public review of the Puget Sound Liquefied Natural Gas project in Tacoma Washington. Our climate is in grave peril and we need to stop building fossil fuel infra structure and transition to renewable energy as quickly as possible. Fracked gas is as harmful as coal in causing global warming, methane leaks happen from mining, to piping and burning. We can no longer give in to individuals who want to make a buck regardless of what harm they inflict on the environment and on everyone and everything that lives on earth.

Sincerely,
Sherry Wade

Steve: Thank you. Paul Wagner?

Paul: Good evening. **[Speaking native language]**. I am Shiocton. Come from house leader, spiritual, intellectual, chieftain, family **[Speaking native language]**. And we're here to let you know that this place, where you live, where your children live has been loved and cared for in a way that is almost incomprehensible by people who have not been here that long.

[04:36:02] We've been here, by current science, 16,000 years and made sacred promises to every living being. So, when you decide that you're going to build a monstrosity that is going to end the wellness for the **[Speaking native language]**, the orcas, the salmon, the **[Speaking native language]**, the human children, it's going to end their wellness. It's going to end their future and a possibility of a good future because our poles are melting. If you did not know, real science says that the Arctic is 40 degrees above average temperature this year recorded. Real science. And 600 fires in British Columbia.

We breathe smoke here in Seattle for weeks equal to smoking seven cigarettes a day.

[04:37:00] And that's if you're standing still. If you're a child running, how many cigarettes is that? A pack? We cannot afford this kind of foolishness any longer. It's an impossibility because, in 160 years, the colonialism has had rule here. It has brought death to most life. And that's the truth. If you want to know where you have come from, you have to look back and take a look at it. And then, you'll know where you're going because, in those 164 years, it has been annihilation for the ancient forests, the natural animals, and indigenous people at 95% annihilation rate.

And if you do not know where you have come from, you will not know where you're going.

[04:38:02] That's our proverb. So, you need to know that what you're doing right now, if you sign off on this deal, you're signing off on the death of the future, your children. You're signing off on that. With incorrect science, your 100 year model, it's a lie. We need to have the truth here. The children deserve the truth. Current science. Take a look at what's going on with the climate. It's collapsing right now, in front of our eyes. The climate systems are collapsing. The poles are melting. And 40 degrees above average temperature higher than normal. And 600 fires in British Columbia.

[04:39:00] We need to end this now. In absolute terms, we need to end this madness right now for the sake of all of our children, every single one of them and their future. That's what we're looking at. We're looking at their future or no future. And if you can't see that, then you are blind. You're blind with colonial insanity. And you need to open your eyes. I pray for you to open your eyes and make the right decision because our elders allowed us to learn what is the right thing for the future generation. And this monstrosity, Puget Sound Energy's bomb, is not the right future for the children or any child, plant, animal, or human living on Mother Earth.

So, please, deny the permit.

[04:40:03] Please use current science. We're begging of you for everyone's children, including yours. I don't know how we can put it in more simple terms. All I can do is pray for you. Thank you.

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 8:41:52 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Sincerely,

Jessica Walalch
jess.wallach@gmail.com
98115

0711-1 23. General Support

RECEIVED
NOV 8 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

November 2, 2018

RE: Comments for the draft SEIS for THE PSE LNG facility

To Puget Sound Clean Air Agency,

I'm a Puget Sound Energy (PSE) employee, and I'm also a mother to two young children. I support environmental projects, policies and technological advancements that will help protect our earth for future generations.

I believe the proposed PSE facility represents a significant benefit to the environmental health of the Puget Sound region. The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

As the draft SEIS points out, LNG is a cleaner alternative to conventional fuels such as diesel. LNG, when used as marine fuel, reduces greenhouse gas emissions by nearly 15% and eliminates visible particulate emissions produced by ships by more than 85%.

I hope PSCAA will move forward and approve the air quality permit(s) necessary for the facility's completion now that the agency has independently verified, through its own SEPA review, the project's environmental benefits and overall reduction in greenhouse gas emissions.

Thank you for your consideration.

Sincerely,

Lindsey Walimaki
9531 112th Ave NE
Kirkland, WA 98033

0470-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing
0470-2 14. LCA Inputs and Assumptions - Leakage/Slippage

Dear Puget Sound Clean Air Agency,

I am an educator in Tacoma & I value the health and livlihoods of the poorest people in our community & around the world. The impacts of climate change disproportionately impact the poorest people who cannot relocate due to fires, flooding, storms, lack of water & pollution that we caused by climate change. I am concerned that this SEIS ~~is not accurately~~ using unacceptably low Methane slippage rates, not incorporating diesel emissions for transporting fuel/workers to fracking wells, assuming credit for maritime customers that don't exist yet, & does not plan for or take into account all BC methane leaks or local climates. This Air permit should not be granted given these holes in this EIS there is insufficient data for faulty science.

Please include this in the final supplemental environmental impact statement.

Name: Lindsay Walker	**Phone:**
Address: 5115 G Street Tacoma, WA 98407	**Email:** walker.lindsay3@gmail.com

0480-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

I am a professional mariner and recreational sailor. I value wildlife in Puget Sound like killer whales + nudibranchs. I also value the ability to eat + harvest fish + shellfish from the Pacific Northwest. I am concerned that impacts of ocean acidification + climate change will hinder mine + my children's ability to enjoy wildlife + seafood in our region over the next 20 years. I am concerned that this SEIS does not uses the GWP for 100 years rather than 20 years. Climate + OA impacts are already affecting + will affect marine wildlife over the next 20 years. Please use the 20 year GWP in the final SEIS. Also please use the GWP from the most recent available science.

Please include this in the final supplemental environmental impact statement.

Name: Lindsay Walker	**Phone:**
Address: 511 S. G Street Tacoma, WA 98405	**Email:** Walker.Lindsay3@gmail.com

0560-1 5. Regulatory Framework

Dear Puget Sound Clean Air Agency,

I am an educator living in Tacoma. I value tribal sovereignty for the Puyallup Tribe. The proposed facility puts treaty rights & the community at risk. The Medicine Creek Treaty has been violated throughout the process of this facility. I stand with the Puyallup in opposition to the LNG facility. Puget Sound Clean Air Agency & all agencys involved in this facility still need to consult with the Puyallup Tribe before proceeding

Please include this in the final supplemental environmental impact statement.

Name: Lindsay Walker	Phone:
Address: 511 S G Street Tacoma, WA 98405	Email: Walker.Lindsay3@gmail.com

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

The tremendous impact of these proposed projects on global warming should be considered in their entirety. Leaks of gas in all of the stages of extraction, transport, conversion to LNG, and then the end usage of the LNG in the user country (probably China) all contribute to an exasperation of global warming. The science is clear – to minimize the damaging effects of global warming is vital – otherwise coastal cities and lands will be flooded by rising sea level, there will be more fires, hurricanes will be more powerful, oceans will be more acidic, and many species will become extinct.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Janet Wall	Email: janet227wall@gmail.com
Address: 22740 SE 56th St, Issaquah, WA 98029	Phone: 425-392-5506

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2026

2026-1 3. Outside of SEIS Scope

I don't feel that the negative effects of the many miles of pipelines have been adequately addressed. The pipelines would cross many rivers and streams, with many possibilities for leaks and explosions. This could cause inordinate damage, including the possibility of human deaths as well as environmental damage. Leaked methane can also cause health effects as well as contributing to global warming.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Janet Wall	Email: janet227wall@gmail.com
Address: 22740 SE 56th St, Issaquah WA 98029	Phone: 425-392-5506

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2044-1 3. Outside of SEIS Scope

As a fishery biologist, I am concerned with the environmental effects of the proposed Kalama methanol refinery. The refinery would take 5 million gallons of water per day out of the Columbia River. Tankers of methanol could spill, causing impacts to the salmon population. Decreasin salmon population is already causing the southern resident Orca whales to starve for lack of food. The liquified gas could also spill during loading or transport, which should also be analyzed as another potential impact on marine life.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Janet Wall	Email: janet227wall@gmail.com
Address: 22740 SE 56th St, Issaquah, WA 98029	Phone: 425-392-5506

B101-3317301

RECEIVED
OCT 24 2018
Puget Sound
Clear Air Agency

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG PROJECT
1904 Third Ave, Suite 105
Seattle,
WA 98101

23 OCT 2018 PM 5 L
SEATTLE WA 980

C. Wallace
12406 E Gibson Rd
Everett WA 98204

I AM writing Today To Ask You To STOP LNG

OUT DATED SCIENCE WAS USED
OUT DATED SCIENCE CONTINUES TO BE USED.
PERMITS WERE NOT ISSUED TO BUILD PROPERLY

THE LOCATION OF THE LNG PLANT SITS ON UNCEDED TRIBAL LAND.
- NO MEAUNGFUL CONSULTATION WAS MADE W/ PUYALLUP TRIBE.

PLEASE REJECT & START OVER WITH A NEW INDEPENDANT ENVIROMENTAL STUDY!

THANK You. C. WALLACE

Steve: Thank you. Next up is Jessica Wallach.

Jessica: Hello. Thanks for being here today to hear our concerns. My name is Jess Wallach. I'm an organizer with 350 Seattle. I'm a person who breathes. And before I begin, I just want to say that I stand here with Puyallup. I recognize that the Tacoma LNG facility has been building without all of their permits in place and in violation of a sovereign nation's rejection of the facility on their land.

[04:46:05] And I stand here and ask you to incorporate, by reference, the tribe's comments in my own. So, I worked for many years as a gardener. And in the summers, when we have smoke, I have to choose between paying my rent, going go work, or being healthy. I wasn't the only person making that choice. People chose to stay inside during the smoky air. And then, they would be really tied up the next month. Or we would be outside and working and then, sick for the whole next month because we'd been breathing in the smoke from the wildfires that were exacerbated by climate change.

And in my family, I had that choice. Not everyone did. A lot of my family members have asthma, and they weren't able to go outside. And those smoky skies, driven by wildfires, driven by climate change, that's increasingly our new normal. Talk about a climate change future.

[04:47:00] Clean air is not something that we can count on. It's not something that will be there for us. And it's, certainly, not something that we can live without. So, when we talk to you today about this facility and about making choices for clean air, I'm asking you to think about what it looks like when people have to choose between going outside or paying their rent, or when they have to choose between going outside and getting food, like some of my family members did.

I'm asking you to take a look at your analysis and think about what opportunity you have to holistically consider the climate impacts of this project. I'm asking you to look at the best available science, the real 20 year numbers for methane leakage and do the right thing. You can change course here and actually consider the climate impacts of this project and actually make sure that we have clean air for the future. Thank you.

1152-2 22. General Opposition
1152-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

1392-1 22. General Opposition

From: Linda Wallmak
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:36:17 PM

Name: Linda Wallmak
Email: wallmarklinda4@gmail.com
Address: 4734 Bradford Loop SE -
Salem, Oregon 97302

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

The recent Special Report 15 of the Intergovernmental Panel on Climate Change tells us that we have only twelve short years in which to make deep, dramatic and rapid reductions in our CO2 emissions in order to avert irreversible changes in our climate with catastrophic impacts on the current system of life on Earth.

Building infrastructure such as that proposed for the Puget Sound Energy Liquefied Natural Gas Project being proposed for Tacoma will lock us into another 40 years of production of LNG. We don't have 40 years. The climate crisis is already well upon us. Everything that the climate scientists have predicted has come to pass with one significant exception—it is happening faster than foreseen.

We must stop all construction of new fossil fuel infrastructure if we are to have any chance at curbing climate change.

1397-1 22. General Opposition

From:	Linda Wallmak
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Thursday, November 15, 2018 2:36:05 PM

Name: Linda Wallmak
Email: wallmarklinda4@gmail.com
Address: 4734 Bradford Loop SE -
Salem, Oregon 97302

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

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We must stop all construction of new fossil fuel infrastructure if we are to have any chance at curbing climate change.

1408-1 22. General Opposition

From:	Linda Wallmak
To:	Public Comment
Subject:	ATTN: Public Comment on DSEIS, PSE LNG Project
Date:	Thursday, November 15, 2018 2:35:54 PM

Name: Linda Wallmak
Email: wallmarklinda4@gmail.com
Address: 4734 Bradford Loop SE -
Salem, Oregon 97302

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

The recent Special Report 15 of the Intergovernmental Panel on Climate Change tells us that we have only twelve short years in which to make deep, dramatic and rapid reductions in our CO2 emissions in order to avert irreversible changes in our climate with catastrophic impacts on the current system of life on Earth.

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We must stop all construction of new fossil fuel infrastructure if we are to have any chance at curbing climate change.

1425-1 22. General Opposition

From: Linda Wallmak
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 2:35:40 PM

Name: Linda Wallmak
Email: wallmarklinda4@gmail.com
Address: 4734 Bradford Loop SE -
Salem, Oregon 97302

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

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We must stop all construction of new fossil fuel infrastructure if we are to have any chance at curbing climate change.

1436-1 22. General Opposition

From: Linda Wallmak
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 14, 2018 9:58:08 PM

Name: Linda Wallmak
Email: wallmarklinda4@gmail.com
Address: 4734 Bradford Loop SE -
Salem, Oregon 97302

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

The recent Special Report 15 of the Intergovernmental Panel on Climate Change tells us that we have only twelve short years in which to make deep, dramatic and rapid reductions in our CO2 emissions in order to avert irreversible changes in our climate with catastrophic impacts on the current system of life on Earth.

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We must stop all construction of new fossil fuel infrastructure if we are to have any chance at curbing climate change.

1365-1 22. General Opposition

From: Joanne Walters
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 9:19:51 AM

Name: Joanne Walters
Email: Greengirlspdx@gmail.com
Address: 7103 N. Maryland -
Portland, Oregon 97217

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Please don't allow this project go forward. You will increase our risk of an Earthquake in the PNW. No more fracking!!!
Thank you

Steve: Okay. Next is Nickie Walters.

Nickie: Hello. I'd like to acknowledge we are currently here in Tacoma on stolen Puyallup ancestral land. And I ask you to find a moment of your time for personal reflection of what that means to you and them, as the historical original caretakers of this land.

[04:10:04] I hear it talked about by many tribal people and elders. It wasn't that long ago, about 160 years ago, when it all changed. These lands used to be so plentiful and abundant with wildlife and natural resources that no one that stepped foot into their territory ever went without. Nobody. I could talk to you about everything you know about polluting industry not measured accumulatively here, cancer rates and mysterious illnesses on the east side that run rampant, TOTE already being in compliance with their fuel requirements, the 100 year versus 20 year plan, how in 12 years we will enter climate chaos.

But I'll send those comments to you in an email plus more. I want to talk to you about my experience with going solar and PSE removing my gas lines and someone I know who actually laid those LNG pipelines in Fife to the port.

[04:11:04] So, I had an opportunity to talk to somebody who laid those pipes. And they were deathly afraid for what they were putting in that ground knowing that that gas was going to be in there. Those were sewer pipelines. They had a sewer pipeline permit. This is not okay. This is going to leak. When I had PSE come and remove my gas out of my home a few weeks ago, I was talking to some of the workers out front about LNG being dirty because they had that going green with LNG truck in my front yard. And they are the ones that pointed out that the backs of the trucks are covered in black soot. And he showed me. He wiped the soot off and showed me the white shining through the soot.

[04:12:00] This isn't as clean as they're making it out to be. Yeah, it might be cleaner, at the burn point, but it's going to leak all over the place from the fracking point. And we have no control over that fracking point. That's in a whole other country, if it comes from that country. Everything changes all of the time with what they're saying. I'm going to send you guys everything in emails. Thank you.

Steve: Thank you. Elizsabeth Parker? Before I call the next speaker, the next group getting ready after that would be Sally Perkins, Desiree

Douglass, Kathy Hewitt, Carlo Voli, and Paul Wagner.

Steve: Thank you.

[04:48:00] Next is Nikie Walters.

Nikie: I already went. I don't know why my name is in there twice. I just want to point out, too, a Seattle city councilman came here, and our own city council is not here today.

1199-1 22. General Opposition

1322-1 22. General Opposition

From: nikie walters
To: Public Comment
Subject: The Truth
Date: Sunday, November 18, 2018 3:38:30 PM

"Why are the people of Seattle more important than the people of Tacoma?"
-Craig Kenworthy, Exec. Director of the PSCAA questioning Port of Tacoma Commissioners about the out of control particulate matter and their undesire to gain control of it by sticking to a timeline to clean it up like Seattle has during a Seaport Alliance Meeting at the Port of Tacoma, Nov. 2017.

I know the PSCAA has never denied a permit. I know the PSCAA feels like your hands are tied to policy. I know you don't have the Native or Environmental representation positions filled at the PSCAA. This can change. all this can be changed.Together we can all change this. We can move forward and passed these hard times. We need and deserve protections in our community. When I was at that Seaport Alliance meeting a year ago and listened to Mr. Kenworthy explain his concerns, it was an emotional moment of realization that told me that the PSCAA understands so much that is wrong which we live bound to in our community in and around Tacoma that we love. I told you at the 1st comment period I spoke at you attended at Bates and I tell you again, Thank you Mr. Kenworthy for sticking up for the people of Tacoma. Please continue to advocate and help us. We are important too. All life is important and we need the PSCAA because no one else seems to understand that with all these shotty reports being forced down our throats. We will never accept whats happening to us just like we would never accept it anywhere else either.
Please at the very least, re due that study and report and begin the comment period all over again. If that study was adequate, the PSCAA would clearly see how bad LNG really is. We only have less than 12 years and we have the science, data, technology and ability to get off this forced dependency to fossil fuels and implement a wonderful butterfly effect of possibilities for the good of the future,. We can do this if we all do this together.

Thank you, Nikie Walters

1558-1 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Discrepancies in report that pose unacceptable risk to our community
Date: Sunday, November 18, 2018 1:45:59 PM

The US Coast Guard uses an analysis reported by Sandia National Laboratories. They have noted that buffers of .3, 1.0 and 2.2 miles with varying degrees of severity depending on the case of the accident. However, since this LNG refinery and 8 million gallon storage is located in a residential area, we have populations of people and homes within 1 mile. According to the analysis being used by the US Coast Guard, PSE is putting a large population of people and their homes at an unacceptable risk and if the Puget Sound Clean Air Agency decides to approve the air permit, then PSCAA is also allowing these populations of people and their homes to exist at extreme risk against the Coast Guards warnings. Either re due the report and begin all over again with a new comment period after the report is redone, or deny the permit and lets explore alternatives that the already highly polluted community of Tacoma would accept.

Thank you,
Nikie Walters

1564-2 22. General Opposition
1564-2 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Environment
Date: Sunday, November 18, 2018 1:06:42 PM

Natural gas, AKA methane, is a more potent greenhouse gas than CO2 and is proven to be dirtier than coal and oil because of all the leaks via fracking/drilling wells, cheap pipelines, poorly constructed pipelines, poorly maintained pipelines, pipeline ruptures and explosions, refining/processing, human error at refineries and storage facilities, flair malfunction, every time it's transferred, increased volume of polluting trucks on our roads and community, trucking accidents on roads, not to mention what goes unreported until/if they are caught and the dissemination chain that nullify claimed greenhouse-gas benefits of LNG.
I also want to mention and acknowledge the fact that tar sands are used in the fracking process and tar sands are the dirtiest most toxic form of oil on the planet. And when they cannot reuse the tar sands anymore, they discard it wherever the state or country they are fracking the gas at allows them to. That means it can be stored in barrels and who knows what they do with it from there. Many sites have fracking ponds that they are able to just discard the tar sands into. These super toxified makeshift ponds are right on the ground next to the fracking wells allowing seepage back into the earth and into water tables which are further polluting them. We cannot control our weather. Weather also plays a part in the toxification of our air and water once fossil fuels are pulled out of the earth. We in The USA cannot regulate what other countries choose to do but we are supporting whatever they are doing. Knowing this and that Canada has the largest most toxic and destructive Tar Sands pits on the planet, is extremely concerning and unacceptable to me that we are supporting Canada in these type of endeavors, let alone bringing it via pipeline into our country. That pipeline explosion last month in Canada which effected our gas supplies in multiple States exemplifies just that and tells us that we need to be investing more in solar and wind as alternatives to bringing gas into our homes and businesses. Solar and wind does not explode such as gas does nor does it release uncontrolled amounts of raw and burning methane deposits into our air furthering causing havoc and contributing to the detriment of our environment.
We have better ways to achieve and meet our energy needs without having to build any new fossil fuel infrastructure. Look at how far humanity has come. We don't need to rely on these old outdated ways for anything. It's possible to live without fossil fuels anymore without having to inconvenience our culture if we just do it. Tesla showed us that many many years ago yet Edison's ideas were implemented instead. We know now this was a huge mistake and it must be righted by changing things before its too late. Less than 12 years are left to fix this. Deny the permit and lets serve the people and planet for a change. The good, right and moral change.

Thank You
Nikie Walters

1566-2 22. General Opposition
1566-2 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Fracking
Date: Wednesday, November 21, 2018 10:59:56 PM

There are 1.7 existing fracking wells in the US today that have already polluted.

Using an average of 4.5 billion gallons (22,727 tons) of water + 5,000 gallons (~19 tons) of 700+ highly toxic chemicals + more than 4,300 tons of sand = the average of ~27,000 tons of fracking fluid per well × 1.7 million fracked wells= the average of 7.65 trillion gallons of water with deadly toxic polluting chemicals and 46 billion tons of fracked fluid that have already been injected into the Earth just in the U.S.

Step 1. Hydrolic fracking
Step 2. Directional drilling
Step 3. Well stimulation
Step 4. Flowback- store for reuse or dispose of in evaporation ponds which, A. Release toxic gases, B. Are not fenced, C. Spills over with heavy rainfall D. Leaks into soil and groundwater. Nearby you will fibd storage tanks with release valves releasing toxic xhemicals into our air.
Disposal on or off site-
Injection wells: Flowback forcefully pumped into underground formations such as salt caverns! These injection wells and seismic testing for fracking sites are causing earthquakes all over including in States that have never been known to ever have earthquakes till recent years.
25-50% of thoes 46 billion tons of used fracked fluid flows back out. Now mix with gas/oil/radon/radiation-some us reused.
But mostly, the volume of toxic flowback is more than the industry can handle.

Pathways for fugitive emissions to excape from wells-
Volatile chemicals in fracking fluid raise carrying radon, radiation, methane, benzene, heavy metals, and many other deadly pollutants.
Toxins from fracking oil and natural gas migrate 1. Into drinking water, aquifers, all soil layers and plant life 2. From the pressurized fracking process itself 3. Through unavoidable cracks and leaks in the cement, conduit, pipelines and storage tanks 4. Into the air we breathe

"Examining the entire fracking process used to produce natural gas, it is worse than coal" - Cornell University

In most states, there is no requirement for fracking companies to disclose the chemicals they use.
Chemicals used in fracking fluid and released by the fracking process effect:
Skin, eyes kidneys, ammune system, respiratory system, cardiovascular system, nervous system, gastrointestinal system, endocrine system, hormones are affected by exposure by the parts per billion, are known to cause cancer, birth defects and death.

These fracking ponds can be found uncleaned and abandoned across the US including on Indian Reservations such as the Blackfeet Nation.

DENY THIS PERMIT OR AT LEAST REDUE YOUR REPORT. WE CANNOT CONTINUE ON THIS DESTRUCTIVE PATH WHEN WE HAVE SO MANY OTHER CHOICES AND OPTIONS.
Thank you.

1570-1 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Health assessment, or lack there of in existance concernig the PROPOSED LNG Refinery and storage
Date: Sunday, November 18, 2018 3:53:14 PM

Oh Lord Creator, give me strength and don't get me started on the fact that The Tacoma Pierce County Health Department isn't required to complete a health assessment on this LNG project even though its consistently being referred to as “proposed”, it is being allowed to be grandfathered into old policy making a health assessment obsolete in this case. PSCAA this is all you. I know you know about the cancer rates and mysterious illnesses occurring on the Eastside of Tacoma down by the Port and in Northend. I know you know of the dangers of dredging the waters of Commencement Bay and that the toxins can only be measured out so far and that the toxins surpass that point. I know you know that the polluting businesses at the Port of Tacoma are spewing toxins into our air and nothing is being measured cumulatively. I know you know our air quality monitoring is minimal and we are well overdue for a good air quality report that tests for everything, but because of the cost of the one we need, it leaves us left out and unimportant as permit after permit gets approved. And as scientists, I know you know a whole lot more than me about all this stuff but we both can understand what goes up, must come down and that we have toxins going into our air are also not being monitored on our water quality reports at all. PSCAA please help us. We need you to protect us. If not for us, then think about the future generations and what we are leaving to them. Please. Please deny this permit and lets begin to do things right for the protection for the people and all living things in the waters and air all around us. we cant keep doing this when there's only 12 years to completely change our culture, privileges and conveniences that come with our forced dependency to fossil fuels. we don't need to be victims to this any more. we have the ability to move passed it if we just do it. Please.

Thank you,
Nikie Walters

1594-1 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Materials breach senario ignored in report
Date: Sunday, November 18, 2018 2:05:32 PM

We all know too well about the nightmarish terrorist attacks in New York and Virginia on 9/11 when planes were hijacked and crashed into the World Trade Center and The Pentagon. Just a couple months ago, a man was able to go undetected and steal an airplane from our local highly surveilled and secured Boeing field and ended up crashing it not too far from the Port of Tacoma. However, Puget Sound Energy's Safety modeling completed for the LNG site DID NOT include a materials breach scenario such as a terrorist attack.

PSE and their LNG supporters claim that a terrorist attack is not likely or warranted and instead points their fingers at the surrounding refineries as a greater risk. this is unacceptable as LNG poses many very explosive risks which are completely being ignored. Moreover, PSE has been sued twice in a Court Of Law, which they lost both cases including a resident representing himself, over the prevention of releasing safety modeling results claiming any potential of a terrorist attack. This concerns me greatly considering the raising frequency of terrorist attacks in this country, the risks imposed in the mixing of jet fuel and LNG in such of an attack going completely ignored, our location on the West Coast on the most dangerous fault line in the world and on a liquefaction zone in consideration to how such an event could trigger the fault line, within a residential area and within proximity to other refineries, its location to businesses, marinas, residential neighborhoods, schools and other populated areas, its location on the water and the fact that water does not extinguish an LNG fire but ignites it more and the fact that fire retardant foam which would in effect heavily pollute and devastate our waters and everything in it if required to extinguish a fire, the impact that such an event would have on our air and create unacceptable and unrecoverable health and safety risk to any life within proximity. And not to mention that this over $300 million project only was required to get an LLC with insurance coverage up to $50 million which is not even enough money to recover PSE's loss let alone what would devastate the surrounding area. This is in fact the same exact issue that California is currently being plagued with from the devastating fires that completely destroyed entire cities and neighborhoods as PG&E is currently being investigated as the cause of the Camp Fire. We don't need these issues in Tacoma or the State of Washington and this must change for the protection of the people, all life and the planet.

What I explain is many unacceptable risks and if PSCAA approves this permit they too would be ignoring the fact that the inevitable can happen even though we have watched such attacks happen in the USA and considering terrorist attacks are indeed on the raise on our Country. Deny the permit or start all over with a new report that addresses all the people of the city's concerns along with a new comment period. Lets consider and explore other ways of meeting the needs of shipping industry while companies like TOTE are operating within regulations on low sulphur diesel.

1606-1 3. Outside of SEIS Scope
1606-2 5. Regulatory Framework
1606-3 7. SEPA Alternatives

From: nikie walters
To: Public Comment
Subject: Not to mention....
Date: Sunday, November 18, 2018 5:03:12 PM

I want to stress to the PSCAA that I support all comments submitted in person, written, faxed and phoned in, in opposition to this PROPOSED LNG refinery and storage. Especailly the comments submitted by the scientists and professionals who's language I may not always understand,` to the most common, marginalized, disabled and at risk people of our communities who end up suffering the most from being a product of our environment. We all are important
I also want to stress that I fully support the Puyallup tribe in opposition and in pursing that their Treaty Rights be honored by all arms of Government, agencies, Corporations, businesses and people of the USA and abroad. The Puyallup Tribe is a Sovereign Nation, which is a Nation within a Nation and they should be treated with the same dignity and respect as all other countries and leaders around the world are. This goes for all Tribes. We must not forget to acknowledge who's territory was stolen and developed against their will by various and any means necessary as we live our lives out among these lands and abroad. We can all coexist in harmony as all Tribes used to before colonization intruded it heavy brutal hand on all the peaceful people of all these lands as long as respect, which is due, is honored. I say this in regards to all tribes of all these lands, not forgetting to include the genocide still being committed around the world for lands and resources that are still being stolen and ravaged by polluting and destructive industries to this day. We as moral people must stop financially supporting the destruction of our planet and the dehumanization of people who's culture connects humanity to the earth.
Together we can and will accomplish many wonderful things, but we must work together towards the common ultimate goal with moral and respect for all.

Thank you,
Nikie Walters

P.S.
While TOTE maybe doing it, ships are not plugging in at port. This is where that black crap that the long shore men complain about is coming from. We need to begin to cover all the roofs at our port in Solar and electrify what we can. This solar power at the ports will also take a burden off of the grid from TPU as the sun powers the port and vehicles needed to operate at the port.

100 year plan vs 20 year plan. This is not ok that a 100 year plan model is being used in the reports especially when the life of LNG is 25 years and the port is expected to be under water by 2030. The port being expected to be under water by 2030 is another factor of this

horrible idea we call Tacoma LNG.

I-1631 failed and that's why we need agencies to protect us. Record amounts of money was poured into the No I-1631 campaign. However, the people didn't vote against our environment, they voted against what the fossil fuel industry turned it into, a regressive tax system because even the No campaign consistently advocated for and challenged Government and environmental agencies for bolder action on climate change. This must start now my denying the permit for the PROPOSED Tacoma LNG. It is dirtier than coal if the facts and data are ran and reported on correctly. So, I urge you to fix the report by running the numbers correctly, restart another comment period, or deny the permit. Thank you.

1613-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

From: nikie walters
To: Public Comment
Subject: Please redue and give us a realistic study
Date: Sunday, November 18, 2018 12:40:57 PM

The Clean Air Agency's analysis is based on 100-year, not 20-year, global warming potential (GWP) values. Given the IPCC report that was released last month indicating that we have 12 years to avoid climate catastrophe, the Clean Air Agency should be using the 20-year numbers, as that is the time frame where action is needed. Using the most recent 20-year value of 96 makes LNG 150% dirtier than the "dirty fuel" it's supposed to replace.

This is unacceptable that numbers are being used in this study and analysis that are meant to serve and fit the mold of polluting industry's needs instead of putting the health and safety needs of the people who would be living in and suffering the repercussions of polluting projects in and around our residential communities. Although I would prefer that the PSCAA denies the permit, please give us a realistic study that we can trust or deny the permit all together.

Thank you,
Nikie Walters

1815-1 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: safety
Date: Sunday, November 18, 2018 3:18:46 PM

As a former City Employee from out of State, I have been well versed over the years in City Disaster Response, so I have very good reason for my extreme concern about the Emergency Response Plan with the LNG refinery, or lack of thereof in existence as its being allowed to be built without permits. According to an engineering consultant report obtained through a Public Disclosure Request, The Tacoma Fire Department will not complete an Emergency Disaster Response Plan until after the project is operational. Now, please understand my perspective here as I explain my concern with this. This is completely unacceptable due to the fact that there are LNG refineries which are known and exposed through a simple google search to have had operations problems on day 1 including reports of covered up and hidden emergencies, issues and problems.

I and every single living person and thing in the community deserve to have a safety plan that should have been drafted, accepted and included as part of the EIS, FEIS and SEIS reports. As a matter of fact, I questioned a Fire Battalion Chief at a meeting once about what exactly is the plan if an emergency occurs involving the LNG site at the port. The best response I got was if anything big happens, the Federal Government will step in. My response back was, oh wow so there is no plan ok, and our conversation stopped there. Now, with that, we have all seen the increasingly strong natural disasters occurring around the world let alone in our Country.

On that note, we saw the Federal response to the hurricanes in places like Louisiana, Texas and Puerto Rico. We saw people fighting for survival by lawlessly looting on an 'every man for himself' mentality, we saw a chemical plant owned by Asarco (same company as the toxic Tacoma Asarco plant) blow up after days of waiting for federal response and we saw our President show extreme disrespect towards the people when an entire island was destroyed and now has defended the EPA. Are we really going to set ourselves up to ensure the largest disaster possible is achieved on the Tacoma Tide Flats and then simply say the Federal Government will save us? We would have no choice but to depend on ourselves and that's the reality so that's why we must mitigate the degree of severity that will be inflicted upon us. What help we do get will leave us all marginalized IF we survive and will be picking up the pieces for years.

According to the earthquake professionals in Washington we already know that we are expected to survive on our own for anywhere between 2 weeks and 2 months until the Federal Government can get to us. This is due to the fact in a disaster to this magnitude, we would be completely isolated and cut off from all directions of anyone getting to us including by way of water. Zero supplies for the living will be obtainable and like in Louisiana, Texas and Puerto Rico, people will be left to lawlessly fend for themselves for survival.

We are subject to liquefaction in an earthquake of 7.4 and above. The port and that LNG

refinery is in the direct path of a lahar zone and there's only 2 ways in and out of that Port. And that's just speaking on natural disasters and the fact that we are well overdue for a big earthquake on the most dangerous fault line in the world, not to mention our fault line up here is connected to the San Andres fault of California and a big enough earthquake on either fault line can set the other off. The truth of the matter is we cannot control or compete with Natural Law even if we tried and no amount of money or science will ever change that. Additionally, the reality is we also have the quickly growing risk of terrorist attacks to worry about everywhere we go anymore and people saying how wonderful this project is don't even consider terrorism as a threat and seems to think the LNG tank is completely unreachable. We must also consider any type of emergency scenario that will in effect throw Superfund soil up into our air. I don't hear a lot about that factor being talked about and this is a serious hazardous risk considering the cancer rates and mysterious illness rates already existing and surrounding the port of Tacoma. All of this as I explain, in many types of emergencies will effect our air.

We are setting ourselves up in a bad way by not already having an Emergency Response Plan drafted and included in all the planning and reports and this will all definitely have a profound negative effect on our air quality. Climate change as the United Nations describes that we only have 12 years left. This means we must stop building new fossil fuel infrastructure now and explore, implement and rely on better choices and options. We must start now since we haven't begun already

Deny the permit or do an adequate study that the people of this city can accept and lets redue the comment period.

Thank you,
Nikie Walters

1848-1 3. Outside of SEIS Scope
1848-2 3. Outside of SEIS Scope

From: nikie walters
To: Public Comment
Subject: Unacceptable public risks not being addressed in the reports
Date: Sunday, November 18, 2018 1:36:25 PM

City of Tacoma and Puget Sound Energy have stated that any dangers posed by the LNG project does not exceed the fence line to the Tacoma LNG property. I am extremely concerned about PSE going around to our neighborhood council meetings and telling residents that they will contain any type of emergency within the fence line when in some cases this is not humanly possible. I also learned at one of these meetings by listening to the residents responses that the community is not falling for it one bit. Steve Storms who is a well respected resident of our community and chemical engineer along with other very intelligent and professional members of our community describe calculations for a blast zone of more like 3 and a half miles. This discrepancy not being addressed by reporting agencies is unacceptable by any standard of our community members.

Additionally, 1 day after the SEIS was completed Tacoma Fire Department safety modeling showed us that there's a 1 mile impact zone. Since this refinery and 8 million gallon storage is in a residential area, it would affect things like anyone on marine view drive, anyone on the water, people taking daily walks in their neighborhoods, the people's homes, businesses, schools, other oil refineries, metal scrap yards, the Puyallup Tribe’s treaty protected reservation lands such as marina and riverboat casino properties, many pipelines carrying gas underground to the LNG refinery, hundreds if not thousands of longshoremen, on very dangerous active fault line and on a liquefaction zone. In the even of an emergency, all these factors will be at great risk and in effect, our air will suffer unacceptable and unintended consequences as so will the raise of GHG on the permitting and reporting agencies account. This is unacceptable by any means.

With the TFD as a reporting agency on safety concerns as well as the professional calculations made by our experts of our community, these statements made by our City officials and PSE are proven to be shortsighted, misguided, flawed and puts public health safety at an unacceptable great risk.

If the Puget Sound Clean Air Agency decides to approve the air permit for the Tacoma LNG refinery, then PSCAA will also be going against the study and warnings completed by TFD by putting a large population of people, businesses and homes at great unacceptable risk. Please deny the permit and lets explore other means of serving local residents and businesses as well as TOTE since they are already operating within regulations by using low sulphur diesel.

Thank You,
Nikie Walters

Steve: Thank you. Next up is Andy Wappler.

[06:19:00]

Andy: Thank you. I'm Andy Wappler. I'm vice president of corporate operations and communications at Puget Sound Energy. And I don't want to reiterate what my colleague David Mills said earlier in the evening. I affirm what he said, in terms of the DEIS. I just want to thank you for today, your fortitude, your endurance today, and for making it possible for the community to come out and make their voices be heard. I know this process, the public involvement with the agency began about a year ago, October of last year, as you had your first opportunities for people to come and speak.

And your process in permitting PSE began even before that. So, thank you to you and to the staff, your colleagues, and Director Ken Worthy, and to the folks who came out here tonight and spent their time. We hope to be able to move forward with what we think will be a very good step for Tacoma and air quality locally. Thank you.

1377-1 22. General Opposition

From: Mona Warner
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Thursday, November 15, 2018 8:08:43 PM

Name: Mona Warner
Email: mamanonie@gmail.com
Address: 6922 SE Mabel Ave -
Portland, Oregon 97267

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

It's time to stop Fracking our Earth and it's time to build the renewable energy resources. Fracking only destroys our beautiful earth. It's like a deadly cancer that humans are inflicting on the earth. All of our energies MUST be learning to use less fuel and cutting back on fuels that are not renewable.

1596-1 14. LCA Inputs and Assumptions - Leakage/Slippage

From: bessbree@nventure.com
To: Public Comment
Subject: need a new draft environmental impact statement for LNG plant
Date: Monday, October 29, 2018 3:32:06 PM

The Puget Sound Clean Air Agency has decided that the City's draft EIS for Tacoma's LNG project was incomplete. We need to pause this process and thoroughly address the environmental problem of methane release.

Since fracking began, the natural gas industry in the U.S. as well as Canada has touted how environmentally clean the fuel is compared to other fossil fuels. The elephant in the room, revealed by various studies in both countries (TNT 10-27-18), is the underreporting of the amount of methane being released daily due to constant venting and leakage during the life cycle of bringing the gas from the ground to consumers.

Because methane is much more potent and long-lasting in the atmosphere than CO2, the last thing Tacoma should do is sign a years-long contract that provides an outlet for natural gas without addressing what the industry has not wanted us to know for years. Until cities and citizens stand up for the tightest regulation of methane release, the natural gas industry will turn a blind eye and continue to save money by emitting far more methane than necessary, exponentially contributing to global warming.

Climate change is real. It's staring us in the face daily around the world. Before the LNG project is fully approved, I urge the city to support a much more comprehensive study of the severe, long-lasting effects of overall natural gas production, specifically fugitive methane release.

Celia Warren
2122 Bridgeport Way W
University Place WA 98466-4824
253 565-3637

1343-1 22. General Opposition

From: Barr Washburn
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 7:45:22 PM

Name: Barr Washburn
Email: barrwashburn@gmail.com
Address: 1821 Jefferson Street -
Eugene, Oregon 97402

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,
Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. I am one of a growing number of concerned citizens that see this project as dangerous and damaging to our environment. We must reduce use of fossil fuels and utilize renewable energy sources to address climate impacts.

The SEIS does not show due diligence by relying on outdated formulas and understating the full effect of fracking. I refer to a recent report from The Pembina Institute.

CItation: Kniewasser, Maximilian and Brianne Riehl. Risks to Water and Public Health from Unconventional Gas in B.C. Pembina Institute, 2018.

The Pembina Institute
610–55 Water Street
Vancouver, BC
Canada V6B 1A1
Phone: 604-874-8558
Copies of this publication may be
downloaded from the Pembina Institute website,
www.pembina.org

Having been born in the Northwest and having spent time sailing and cruising these waters the threat to sea mammals, fisheries and ocean already under stress cannot be overstated. Please ensure that that there us a more rigorous review of the potential environmental impact of this project.

0476-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

The most recent research and data clearly show that methane, fracked methane, is dirtier than coal. If you truly consider the gas from fracking to 20 years in the atmosphere, you will not grant this permit.

Please include this in the final supplemental environmental impact statement.

Name: Steve Way	Phone: 253-363-2056
Address: 13129 SW 248th Vashon, WA 98070	Email: scway45@gmail.com

0478-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

The SEIS should include health concerns in the region. Such assessments were "grandfathered" in when the EIS was written. This alone, is a reason enough to not grant the permit at this time. Health is your main concern. STOP, and get valid information re health. DO YOUR JOB.

Please include this in the final supplemental environmental impact statement.

Name: Steve Way	Phone: 253-363-2056
Address: 13129 SW 248th Vashon, WA 98070	Email: Scuby450@gmail.com

0479-1 22. General Opposition

Dear Puget Sound Clean Air Agency,

I have children + grandchildren who live in the Tacoma area. Your job is to protect them, both short term and long term. Please insist on a proper SEIS, based on a complete review of current research an data.

Please include this in the final supplemental environmental impact statement.

Name: Steve Way	Phone: 253-363-2056
Address: 13129 SW 248th Vashon, WA 98070	Email: scway45@gmail.com

0559-2 22. General Opposition
0559-2 8. No Action Alternative

Dear Puget Sound Clean Air Agency,

I hope this is old news for you but....
The state's SEPA document explicitly states that poor planning is not a reason to go ahead and grant a permit. So the fact that PSE has continued to build without required permits is a non-factor in your decisions

Please include this in the final supplemental environmental impact statement.

Name: Steve Uday	Phone: 253-363-2056
Address: 13129 SW 248th Vashon, WA 98070	Email: scway45@gmail.com

Steve: Thank you. So, next is Steve Way.

Steve: Before I start, I'd just like to clear out a personal note. There's a lot of strong feelings in the room here tonight. That includes me. I've been arrested, gone to jail, gone to trial over the Puyallup Nation land rights and the LNG facility. But we need to treat each other with respect here tonight. We've got enough rancor in this country going on. And in this forum here tonight, I would just urge us all to treat each other with respect. That's it. I see your responsibility here as being to follow the proper procedures as outlined by the state regs. And being a government agency, to represent the people.

[06:07:03] The second point, the SEPA document specifically says that poor planning is not a reason to grant permit. So, the fact that PSE has continued to build is not a factor here. Moving on. The process here. It was pointed out, during the EIS public hearings repeatedly that the Puyallup Tribe has a stake here. And that was ignored totally. The Puyallup Tribe is a nation. Some of the state regs, when it talks about local entities that should be consulted, talks about local entities that should be consulted, specifically uses the word tribes.

A couple hundred yards over here, Tacoma City Council Hall, the flag of Puyallup Nation stands there with the flag of the state of Washington and so for. They're stakeholders here. And the fact that you guys ignored them the first time around doesn't change that.

[06:08:00] And, hopefully, it just means that we have to go around again because they are, obviously, significant stakeholders in this thing, and they were ignored. My time is running out. So, I would just say that common sense, on this thing, this smell test, look around the country. There was bad air, I'm talking about the Lower Mississippi, I'm taking about around Houston and all of there, those communities are dying. Sometimes, literally, with people, a lot of disease. And you can look all of this stuff up. And so, I would just – I'm running out of time.

So, I would say your job is not to represent shareholders of a for profit company. Your job is to represent the people in the Puget Sound area. That's what you're here for. And you haven't done it, on this EIS. You haven't done it on the SEIS. There's accurate data. We all talk about our data. You can compare the data.

[06:09:00] I'll stand with the folks that are with me. And you just need to do your job and go around on this thing again. We're all tired of it. But go around again and get an accurate, following the procedures, following the data, SEIS. Thank you.

1355-1 22. General Opposition

From: Laurie Webber
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 2:17:34 PM

Name: Laurie Webber
Email: lwebberlmt@hotmail.com
Address: 3630 NE 10th Ave -
Portland OR 97212, Oregon 97212

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Natural gas is not the future. The toxics If gas extraction is unacceptable. No amount of money should be spent for natural gas extraction anywhere. We must do better than to pollute the air and water we all depend on for life. We can do better. The time is now.

1504-1 22. General Opposition

From: Dana Weintraub
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:10 PM

Name: Dana Weintraub
Email: mrdanaweintraub@gmail.com
Address: 17124 S.W. Marty Lane -
Beaverton, Oregon 97003

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This is a simple message: Do the right thing.
For once, resist the temptations of greed.

2069-1 3. Outside of SEIS Scope

ar Port of Kalama, and Cowlitz County,
ar Puget Sound Clean Air Agency,

We are becoming more and more aware of the tenuous existence of our orca, whales, and salmon. Water contamination is a serious threat to the health of our fish and sea mammals. I am very concerned that fracking will increase water contamination. The SEIS should consider the potential impact on water of fracked gas.

ease include this impact in the Final Supplemental Environmental Impact Statement.

lame: KRISTI WEIR	Email: kbweir@hotmail.com
ddress: 4639 - 133rd Ave SE Bellevue, WA 98006	Phone: 425-747-8480

2070-1 12. LCA Inputs and Assumptions - Global Warming Potential Value

SIERRA CLUB

350 SEATTLE

350 east

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned with the environmental impact of methane in fracked gas as it's GHG is 86 times more powerful than CO_2 over a 20 year period. Permitting agencies need to use this most up-to-date warming potential for methane — 86 CO_2 equivalents.

Please include this impact in the Final Supplemental Environmental Impact Statement

Name: KRISTI WEIR	Email: khweir@hotmail
Address: 4639 - 133rd Ave SE Bellevue, WA 98006	Phone: 425-747-8480

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned that the SEIS will not capture the full environmental impact of this large METHANOL Refinery. Don't be swayed by the refinery owners' assertion that it will only be run at partial capacity. Therefore, it is imperative to study its full effects at full capacity.

Please include this impact in the Final Supplemental Environmental Impact Statement

Name: KRISTI WEIR	Email: khweir@hotmail.com
Address: 4639 - 133rd Ave SE Bellevue, WA 98006	Phone: 425-747-8480

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

2107

2107-1 3. Outside of SEIS Scope

I am concern with dangers associated with pipelines. Pipelines leak methane, pollute the atmosphere, and may explode. SEIS must include the social, health, and environmental impact of building new pipelines.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: KRISTI WEIR	Email: Kweir@hotmail.com
Address: 4639- 133rd Ave SE Bellevue WA 98006	Phone: 425-747-8480

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

2108

2108-1 3. Outside of SEIS Scope

I am concerned with the public health effects of fracked gas. Fracking emits toxic chemicals into the air and water. Studies have shown fracking is associated with ↑ asthma & ↑ in some cancer, the SEIS must study and include these negative health impacts.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: KRISTI WEIR	Email: kkweir@hotmail.com
Address: 4639 - 133rd Ave SE Bellevue, WA 98006	Phone: 425-747-8480

1839-1 22. General Opposition

From: Sophie Weir
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Wednesday, November 21, 2018 3:31:37 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS. I am a high school senior and I am really worried about my future. I hope you will take the concerns of my generation seriously.

The Tacoma LNG plant would be harmful to local fish and wildlife, the community of Puget Sound, and our climate.
Liquified natural gas is treated as a clean alternative to other fossil fuels. However, nothing could be further from the truth. Methane, a potent greenhouse gas, leaks into the atmosphere during production, transportation, and liquification of natural gas. Methane traps heat more than 30 times more efficiently than CO2, making these leaks exceedingly dangerous for our planet's health. All this means that while LNG burns cleaner than many other fossil fuels, it's overall effect on the climate is just as, if not more detrimental than its competitors.
What's more, LNG plants have an ugly track record of disaster — leaks and spills aren't just probable, they're inevitable. With the diverse array of local wildlife, as well as neighborhoods just a couple miles of shoreline away from the proposed plant, the Tacoma LNG project isn't a risk worth taking.
The Puget Sound area, our planet, and my generation deserve a healthy future. We're counting on you to deny dirty LNG projects like the Tacoma plant, so that future can become a reality.

Sophie Weir
bebop.pdx53@gmail.com
3400 SE 26th Ave
Portland, Oregon 97202

From: Twylia Westling
To: Public Comment
Subject: Comments on LNG DSEIS
Date: Saturday, November 17, 2018 8:33:51 PM
Attachments: T.Westling LNG DSEIS Comments.pdf

Please find attached a pdf of my comments to be considered, answered, and entered into the record.
Thank you

--
Twylia Westling, MPA
The 'i' is silent; I'm not.

1320-1 16. LCA Inputs and Assumptions - Hydraulic Fracturing
1320-2 3. Outside of SEIS Scope
1320-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1320-4 13. LCA Inputs and Assumptions - Natural Gas Source
1320-5 13. LCA Inputs and Assumptions - Natural Gas Source
1320-6 19. LCA Inputs and Assumptions - End Use

November 17, 2018

Twylia Westling, MPA
Founder, Civic Actions for the Salish Sea
Tacoma, WA 98422

RE: Comments on the Draft SEIS (DSEIS) for PSEs LNG facility

Dear Puget Sound Clean Air Agency,

After careful consideration and contemplation, I would ask that you please consider my questions and concerns noted below:

1. It appears that the SEIS does not address the trucks needed to move fracked gas, including the water and sand used in the fracking process. Leaving this unmeasured and unaccounted for in the SEIS is a serious deficit to understanding the full impact of upstream GHG impacts.
2. Has PSCAA ever denied a Notice of Construction? An Air Operating Permit? If not, how can the public be assured that the agency is actually holding industry accountable to
3. As PSCAA is aware, the IPCC October report is clear in the recommendation that if communities don't start reducing GHG production now, we will be in dire climate chaos by 2040. Realistically, we have LESS THAN 12 years to halt the climate chaos predicted by IPCC. That means we must start now. Scientists report that methane "...is a major force in short-term global warming because it has 80 times the heat trapping potential of carbon dioxide in the first 20 years..." (Gardner, 2018) (https://www.reuters.com/article/us-usa-methane/u-s-energy-industrys-methane-gas-emissions-underestimated-by-epa-study-idUSKBN1JH2TP) after entering the atmosphere. The trees won't survive the next 12 years, human life won't survive the next 12 years, if the methane that is released within the first 20 years is more potent. These emissions must be measured in this framework of 20 years, and not 100 years.
4. It is very concerning that the SEIS used the 2007 WAC measurement instead of the most recent studies which show the more serious impacts of methane on the environment, specifically the values associated with the 2013 IPC AR5 and the values available through a scientific study published in 2016. Additionally, the SEIS did not even refer to at least 2 recent studies that document how methane emissions in Canada, where the fracked gas will supposedly come from, are under-reported.
    a. https://davidsuzuki.org/wp-content/uploads/2018/01/investigating-fugitive-emissions-abandoned-suspended-active-oil-gas-wells-montney-basin-northeastern-british-columbia.pdf
    b. https://davidsuzuki.org/wp-content/uploads/2018/07/mobile-measurement-methane-emissions-natural-gas-developments-northeastern-british-columbia-canada.pdf
5. What precedent, if any, is used to enforce PSE sourcing and burning gas ONLY from British Columbia? What are the administrative and legislative mechanisms for ensuring that they adhere to this criterion? Please note that if they use gas from anywhere besides British Columbia, the results of their total emissions burden would be worse than if they did nothing at all. There were no measurements or evaluations for fracked gas from sites not located in British Columbia.
6. The analysis was done assuming that there is a market beyond the two TOTE ships and they are claiming GHG credit for these ships, which are not confirmed at this point in

1320-6 cont'd 19. LCA Inputs and Assumptions - End Use
1320-7 10. LCA Calculations
1320-8 5. Regulatory Framework

time. What happens if it takes them two years to obtain additional customers beyond TOTE? Additionally, please consider that all ships are reportedly going to be dual fuel capable, meaning that they will still be able to burn bunker fuel. What guarantees do we have that these unconfirmed shipping customers are going to only use LNG, in order for that credit to be realistic? If the guarantee can not be made, the credit should be reduced.

7. I think it has to be noted that the draft SEIS should be viewed in context of who PSE is as an entity in the State of Washington. PSE has a history of not being responsible with regard to the assets and infrastructure that they are supposed to be managing. They have also been found, on at least two occasions, to have taken advantage of rate payers to their benefit. Their report is frighteningly incomplete – there are at least 10 places in the study that have "placeholder" values instead of actual data. Knowing this history, and in the context of all the issues I have pointed out in this letter, why would we trust PSEs report?
8. I also want to acknowledge that I stand in support of the Puyallup Tribe of Indians and affirm their opposition to this plant.

I request that the Clean Air Agency complete the draft SEIS, re-issue it, and then reset the public comment period so that these questions can be assesses and addressed in a transparent and responsible way.

Sincerely,

Twylia Westling, MPA

0442-2 22. General Opposition
0442-2 3. Outside of SEIS Scope

Testimony at Puget Sound Clean Air Agency Hearing - Tacoma October 30, 2018

Hello, I'm Bill Westre, a retired aerospace engineer and a Sierra Club volunteer. I wish to testify against the introduction of new LNG infrastructure.

I would like to comment on the impact of GHG's in the atmosphere. As an engineer I have studied and practiced Thermodynamics - the science of how heat is transferred.

The earth is heated (as everyone knows) by the radiant heat of the sun. But what prevents the earth from overheating? It is the cooling from thermal radiation to deep space that we experience most dramatically on a cold clear night. The 1st Law of Thermodynamics informs us that **when the heat coming to earth is greater than its cooling to space, the temperature of the earth has to increase**. That is our current condition.

Since we can have little effect on the heat coming to the planet, we need to focus on how it is cooled. What controls the cooling rate?

The presence of GHGs in the atmosphere reduces its emissivity – a thermodynamic factor that determines the effectiveness of a body to radiate heat.

Since the Industrial Revolution the concentration of GHGs has increased nearly 50%, which has dramatically reduced the emissivity and the ability of the earth to cool itself.

Further thermodynamic analysis demonstrates this clear reality - **until the GHG concentration already in the atmosphere returns to near the pre-industrial level, the earth's heating rate will be greater than its cooling rate, causing temperatures to continue to increase and climate change to continue to accelerate for centuries.**

This is why scientists are now telling us to reduce all fossil fuel emissions to near zero by 2040.

It should be obvious that building new fossil fuel infrastructure is the exact opposite of what we need to do for future generations to survive. We need to be shutting down all that existing infrastructure now.

Together we can do this!

Willard (Bill) Westre
15704 SE 44th St
Bellevue, WA 98006
wwestre@hotmail.com

1237-1 22. General Opposition

Carole: Thank you. Nancy Farrell? Willard Westre?

Willard: Hello. I'm Bill Westre, a retired aerospace engineer. And I'm a Sierra Club volunteer. I wish to testify against the introduction of the new LNG infrastructure. I would like to comment on the impact of greenhouse gases in the atmosphere. As an engineer, I studied and practiced thermodynamics, the science of how heat is transferred.

[02:31:07] The earth is heated, as everyone knows, by the radiant heat of the sun. But what prevents the earth from overheating? It is the cooling from thermal radiation to deep space that we experience most dramatically on a cold, clear night. The first law of thermodynamics informs us that when the heat coming to the earth is greater than its cooling to space, the temperature of the earth has to increase. And this is our current condition. Since we can have little effect on the heat coming to the planet, we need to focus on how it is cooled. What controls the cooling rate?

The presence of greenhouse gases in the atmosphere reduces its emissivity, a thermodynamic factor that determines the effectiveness of a body to radiate heat.

[02:32:02] Since the Industrial Revolution, the concentration of greenhouse gases has increased nearly 50% and has dramatically reduced the emissivity and the ability of the earth to cool itself. Further thermodynamic analysis demonstrates this clear reality that, until the greenhouse gas concentration already in the atmosphere returns to the near pre-industrial level, the earth's heating rate will be greater than its cooling rate causing temperatures to continue to increase and climate change to continue to accelerate for centuries.

This is why scientists are now telling us to reduce all fossil fuel emissions to near 0 by 2040. It should be obvious that building fossil fuel infrastructure is the exact opposite of what we need to do for future generations to survive.

[02:33:08] We need to be shutting down all of that existing infrastructure now. Together, we can do this.

1364-1 22. General Opposition

From: JAMES WHIPPS
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 9:47:56 AM

Name: JAMES WHIPPS
Email: jw@childpeace.org
Address: 9038 N FORTUNE AVE -
PORTLAND, Oregon 97203

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Hello,
For all the reasons you have heard, yes, I oppose the LNG refinery, terminal, etc.
The future is with renewables. It just is. Saying no to this project will send a strong message of hope and sanity.

Thank you,

1739-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 2:25:40 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

The LNG is a ticking time bomb. It's not safe, not clean energy. It's also being built against Federal Law. I stand with the Tribe. This is against the treaty.

Sincerely,

Kathi White
seattlefemme43@yahoo.com
98409

1800-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 10:02:02 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's LNG project increases our greenhouse gas emissions and fuels climate change - which means more wildfires and smoke for our region. The resulting air pollution makes us sick and leads to higher rates of asthma attacks, heart problems and cancer in our communities.

Sincerely,

Lael White
laelcwhite@gmail.com
98043

2572-2 22. General Opposition
2572-2 22. General Opposition
2572-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2572-4 13. LCA Inputs and Assumptions - Natural Gas Source
2572-5 7. SEPA Alternatives
2572-6 19. LCA Inputs and Assumptions - End Use
2572-7 10. LCA Calculations
2572-8 22. General Opposition

From: janetwicks@everyactioncustom.com on behalf of Janet Wicks
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Saturday, October 27, 2018 11:35:36 AM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project. I have a five generation connection to the city of Tacoma and surrounding communities. The early industrial growth around our Commencement Bay and tide flats region contributed to the contamination and poisoning of the regions air, water and soil over the years. Before EPA regulations these industries were pretty much unchecked when it came to safe and conscientious waste disposal and emission control. The chemical plants, the gas and oil companies, the log yards, the copper smelter, the paint manufacturers, and the paper mills all created high levels of pollution that are still being cleaned up today. The Aroma of Tacoma was not a joke it was deadly. The safety of this LNG plant is just as worrisome as any of these, and the explosive nature of the product is catastrophic. Tacoma should not accept this hazardous industry. I have a grandchild living in OldTown and another growing up in U.P. I don't want them, or anyone else exposed to the dangerous consequences of another volatile industry. Janet Wicks
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Janet Wicks
8605 42nd St W University Place, WA 98466-7501

1488-1 22. General Opposition

From: Joe Wiederhold
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Monday, October 29, 2018 7:06:02 PM

Name: Joe Wiederhold
Email: jwiederhold47@gmail.com
Address: 1405 Edwards St -
Bellingham, Washington 98229

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

No fracked gas in Tacoma!!

Carole: Thank you. Tracy Wiegman?

Tracy: Hello. I am a Tacoma resident. A member of the International Longshore and Warehouse Union, and I have worked in the Port of Tacoma for 33 years. The port that sits on the Puyallup estuary and the ancestral homelands the Puyallup Tribe.

[01:49:02] I value good working class union jobs as well as a healthy ecosystem in which to raise a healthy family. I believe these two are possible together, when great care is taken to keep the next generations to come in the forefront of all decisions. I am extremely concerned about the narrow focus of the exclusive no action alternative versus the proposed action analysis. There are other alternatives that are viable and necessary, if we are going to turn around the destruction and heating up of our planet.

In an article by 350 Seattle, they say there is significant evidence that the boom in fracking has played a major role in suppressing the development of renewable energy as cheap gas has flooded the market competing against and pushing out clean energy sources like solar and wind. The TOTE ships plug into shore power when docked in to Tacoma, the only ones that do, eliminating the need to run their diesel engines for power. Yet, the loading of the TOTE vessels and all of the ships coming to the port are done with diesel powered terminal semis and other diesel equipment.

[01:50:03] The port and the city of Tacoma, along with the Pierce County and the state of Washington, could be investing in shore power plug in capability for all of the terminals and electric equipment and their charging stations powered with solar and/or wind. The Port of Tacoma just approved a 30 year lease with Wallenius Wilhelmsen Logistics who way that to comply with the 2020 global sulfur cap regulations has been pursuing a four stream approach and have concluded the fourth stream, which is LNG, has not met the requirements for lean green enough for their vessels.

Considering the recent IPCC report stating urgent and unprecedented changes are needed, we must step up bravely with radical and fast change now. You say, in your draft SEIS that the climate change impacts would occur under both alternatives. Well, the low margin of benefit that you claim of the proposed action compared to the no action is not good enough.

[01:51:05] We don’t have the time to waste. We don’t have the time to be building any new fossil fuel infrastructure at all. Thank you.

1268-1 7. SEPA Alternatives
1268-2 3. Outside of SEIS Scope

RECEIVED
NOV 21 2018
Puget Sound
Clean Air Agency

Dear PSCAA,

Hello, I am a resident of Tacoma Washington and I work in the Port of Tacoma, which sits on the Puyallup Estuary and the Ancestral homelands of the Puyallup Tribe. I have been a member of the International Longshore and Warehouse Union for 33 years. I value good working class union jobs that can take care of a family and contribute to the economic well being of the local community. I also value a healthy ecosystem in which to live and thrive and raise a healthy family. I believe these two are possible together when great care is taken to understand where we are, where we have been and where we need to be heading to achieve these goals and especially keeping the next generations to come in the forefront of all decisions. I have a list of concerns about the Draft Supplemental Environmental Impact Statement that your agency just released and how this can negatively affect who I am, my values, the health of my family, friends and co-workers, my community, future generations and this beloved land, water and air that we all depend on.

#1) The exclusive *No Action Alternative* vs the *Proposed Action analysis on the life-cycle GHG emissions.*

I am extremely concerned about this narrow focus which excludes other alternatives that are viable and, at this point in history, necessary if we are going to have any possibility of turning around the destruction of our climate and world. "There is significant evidence that the boom in fracking has played a major role in **suppressing the development of renewable energy**, as cheap gas has flooded the market, competing against and pushing out clean energy sources like solar and wind." (Gas: The Most Dangerous Fossil Fuel of All? by 350 Seattle, Oct. 7th, 2018)

The primary customer for this LNG refinery, storage and bunkering facility, at this point, is TOTE. When the TOTE ship docks in Tacoma they plug into shore power, eliminating the need to run their diesel engines for power. Yet the unloading and loading of the TOTE vessel is done with diesel powered terminal semis. Investing in electric terminal semis and the infrastructure to support them, including solar and/or wind powered electrical charging stations, would have gone much farther in cleaning up air quality around TOTE and within the Puyallup Estuary.

1268-2 cont'd 3. Outside of SEIS Scope
1268-3 4. Language
1268-4 3. Outside of SEIS Scope

The Port of Tacoma, along with the City of Tacoma, Pierce County and even the State of Washington, could be investing in shore power plug in capability for vessels at all the terminals in the port and the infrastructure to support electric terminal semis. They could be providing incentives to these companies that do business at the Port of Tacoma to help them with investing in shore power capability for their ships and in electric terminal semis.

There was a very interesting report that came out February 6th, of this year by Roger Strevens, Vice President, Global Head of Environment at Wallenius Wilhelmsen Logistics where he says, "We are passing a 'green point of no return' as the new age of environmental impact begins." and "….in keeping with our new environmental strategy, seeks out 'Lean:Green' solutions - those that are both economically and environmentally sustainable." He goes on to say that WWL has been pursuing a four-stream compliance approach to meet the coming 2020 global sulphur cap regulations. "Post January 1st, 2020 we will comply through use of three of those four streams, namely: Marine Gas Oil (MGO), exhaust gas scrubbers and Ultra Low Sulphur Fuel Oil (ULSFO). The Fourth stream, Liquid Natural Gas (LNG) has so far not met the requirements of Lean:Green for RoRo vessels in global operations." Earlier this year the Port of Tacoma approved a 30-year lease with Wallenius Wilhelmsen Logistics to develop an auto processing facility on the former Kaiser Aluminum site allowing WWL to expand their marine cargo business.

PSE also is claiming the need for this LNG to provide energy to it's customers during peak demand times of the year. I feel this is also an unnecessary reason to build an 8 million gallon facility that **may** only narrowly be better for GHGs, **IF** the source of the gas comes from BC, especially comparing it to doing nothing! To provide more back up energy resources during peak demand times, PSE could be investing in a battery storage system along with continued investments in solar, wind and energy efficiency. The City of Tacoma, Pierce County and the State of Washington could also be investing more into these alternatives, especially energy efficiency and including investments into electric vehicle infrastructure and incentives for buying electric vehicles and incentives for home owners to invest in solar for their homes.

1268-5 12. LCA Inputs and Assumptions - Global Warming Potential Value

#2). The use of LNG produced by the Proposed Action, instead of petroleum-based fuels for marine vessels, trucks, and peak shaving is predicted to result in an overall decrease in GHG emissions in the Puget Sound region, a net beneficial impact compared to the No Action Alternative.

First of all I am concerned about the language of this statement where it says, "in the Puget Sound region". I am concerned because my understanding is this study of GHGs is suppose to cover the life cycle of GHG effects from source extraction to the burning of this fracked gas product not just within the Puget Sound region.

Second, I am concerned about the low margin of so called benefit of the Proposed Action compared to the No Action. I feel it is a horrendous and irresponsible conclusion to consider this low margin acceptable in saying it will some how benefit us, especially when you couple it with the fact that we could be investing in so many other alternatives that will give is a much larger margin of benefit! And also especially when one considers the very real extreme risk of locating this dangerous facility in such a populated location! Then adding in there the source of the fracked gas needs to solely come from British Columbia to reach these figures. I know there will be commenting on this aspect and the faulty science and numbers concerning this conclusion so I will just say that from what I've learned I feel there needs to be far more investigation Into these conclusions.

Third, considering the recent report put out by the UN Intergovernmental Panel on Climate Change stating, "urgent and unprecedented changes are needed", and that we have only 12 years to "limit climate change catastrophe", we must take heed and step up bravely with radical and fast change now! You say right here in this draft SEIS report that, **"climate change impacts would occur under both alternatives."** So, again, those low margins are not enough to warrant this LNG facility being granted permission to keep us on the road of fossil fuel burning and the continued contribution to the warming of the Earth's atmosphere! All new fossil fuel infrastructure needs to stop right now!

In conclusion:

I am asking you, the Puget Sound Clean Air Agency, as an agency who I look to for the protection of the air we breath for not only myself, my family and my community but for all life that depends on clean air, to go back and do a more thorough, complete SEIS, using current, up to date, best science available, adding in other alternatives we could be doing instead of only the No Action alternative. And when you are done to come back and start a brand new, full public comment period.

In addition, as you do this, I ask that you keep foremost in your hearts and minds that we are living in a whole new world of urgency that calls for far more than the usual status-quo-business-as-usual mentality! We need to be looking ahead at what we, as adults and elders, are creating and leaving for our children, grandchildren, great grandchildren etc.....

My question to you is what are you willing to do for your children?

I will be praying for all of you and all of us and All Life, Water, Air and Earth.....

Many Bright and Beautiful Blessings to You All.....as you work on this most important decision.....

Thank you for your time and your consideration of all I have said here, coming from so many hours upon hours upon hours of research, direct experience and deep contemplation of this situation.....

Tracy Wiegman

6513 E. B St.
Tacoma, Wa. 98404
danceinmygarden@yahoo.com

From: Tracy Wiegman
To: Public Comment
Subject: DSEIS for the LNG refinery, storage and bunkering facility in Tacoma
Date: Monday, November 19, 2018 8:49:03 AM

Dear PSCAA,

Hello, I am a resident of Tacoma Washington and I work in the Port of Tacoma, which sits on the Puyallup Estuary and the Ancestral homelands of the Puyallup Tribe. I have been a member of the International Longshore and Warehouse Union for 33 years. I value good working class union jobs that can take care of a family and contribute to the economic well being of the local community. I also value a healthy ecosystem in which to live and thrive and raise a healthy family. I believe these two are possible together when great care is taken to understand where we are, where we have been and where we need to be heading to achieve these goals and especially keeping the next generations to come in the forefront of all decisions. I have a list of concerns about the Draft Supplemental Environmental Impact Statement that your agency just released and how this can negatively affect who I am, my values, the health of my family, friends and co-workers, my community, future generations and this beloved land, water and air that we all depend on.

#1) The exclusive *No Action Alternative* vs the *Proposed Action analysis on the life-cycle GHG emissions.*

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The Port of Tacoma, along with the City of Tacoma, Pierce County and even the State of Washington, could be investing in shore power plug in capability for vessels at all the terminals in the port and the infrastructure to support electric terminal semis. They could be providing incentives to these companies that do business at the Port of Tacoma to help them with investing in shore power capability for their ships and in electric terminal semis.

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living in a whole new world of urgency that calls for far more than the usual status-quo-business-as-usual mentality! We need to be looking ahead at what we, as adults and elders, are creating and leaving for our children, grandchildren, great grandchildren etc…….

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I will be praying for all of you and all of us and All Life, Water, Air and Earth……..

Many Bright and Beautiful Blessings to You All…….as you work on this most important decision…….

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Tracy Wiegman

6513 E. B St.
Tacoma, Wa. 98404
danceinmygarden@yahoo.com

1505-1 5. Regulatory Framework
1505-2 22. General Opposition
1505-3 14. LCA Inputs and Assumptions - Leakage/Slippage
1505-4 5. Regulatory Framework

From: Philip Wight
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:08 PM

Name: Philip Wight
Email: wight.phil@gmail.com
Address: 2440 Western Ave -
Seattle, Washington 98121

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

I write today in opposition to Puget Sound Energy's LNG Project. I am opposed to this project for several reasons:

1) I am concerned about the integrity and promises of the company since they began construction of the project without a critical permit, then announced a fiat accompli to the community. PSE does not seem to be a good neighbor interested in the concerns and health of the community.

2) Various studies have shown that the upstream greenhouse gas emissions from natural gas produced by fracking are significant and belie the idea of natural gas as "clean" or a "bridge fuel." In the case of PSE Energy, the numbers shown for British Columbian gas (if indeed PSE can be held to just use that source) are questionable for methane leak rates. These leaking hydrocarbons and fugitive emissions mean that natural gas can be as dirty as coal and offers no "clean" pathway--- not today, and certainly not 40 years in the future when we need to have moved decisively away from carbon-based energy sources. We must consider the TOTAL IMPACT of a project like this.

3) Constructing this facility will lock in decades of dirty emissions. Large projects like PSE are sunk investments that demand long time lines. By approving this project, the Clean Air Agency is giving its approval for DECADES of harmful emissions to the community.

4) This project does not have the consent of local First Nations.

Thank you for your time and in the interests of public health please reject this dirty project.

From: chriswillard
To: Public Comment
Subject: Statement on Tacoma LNG Plant
Date: Tuesday, November 20, 2018 9:15:45 AM
Attachments: Statement.pdf

Chris Willard

2528-1 3. Outside of SEIS Scope
2528-2 3. Outside of SEIS Scope

November 19, 2018

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Statement Against Expansion of Facilities, including an LNG Plant, in Tide-flats without Adequate Review and Without Complete Subarea Plan

Dear Board Members

I am writing this letter to request that you maintain the current interim regulations regarding development of industry in the tide-flats with the following retraction: Do not allow a 10% expansion of existing facilities as is currently allowed in the interim regulations. **As a member/attender at Tacoma Friends Meeting (Quakers) with a deep concern for others and for the Earth, I urge you to maintain interim regulations and to force companies to wait and comply with Subarea Planning Process, as this process allows time needed for public review and consensus on issues that are very important to the health and well-being of our community.**

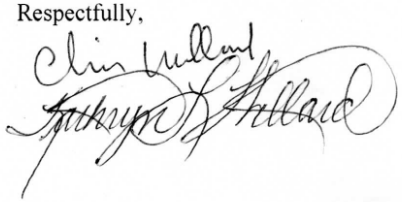
My concerns regarding the fast-tracking of the LNG plant and other development in our community include:

- Inadequate environmental review.
- Harmful effects of further industrial development to local water, air, animals and people.
- Environmental waste from prior industrial use at the Port of Tacoma still has not been removed.
- Potential for catastrophe in event of earthquake or volcanic eruption.
- Impact of catastrophe near densely populated area.
- The safety of detainees at the nearby detention center.
- Companies that promise jobs are not held accountable for : number of jobs created, who gets these jobs, and the cost to public health (air and water quality, diseases) of these jobs

In addition, I advise against any fast-track development of fossil fuel industry, given the recent dire warnings of United Nations International Panel on Climate Change and given all indicators that climate change: increasing forest fires, mass extinction, increasing climate-related hurricanes and storms.

I urge you to consider the long-term impact of our choices on all members of our community and on the planet as a whole. Friends testify to the sanctity of all life and are committed to social justice. Please consider all viewpoints and develop consensus when making critical decisions. I urge you also to hold companies that may cause public harm accountable for their actions and accountable to our community.

Respectfully,



1349-1 22. General Opposition

From: Bob Williams
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Saturday, November 17, 2018 6:26:00 AM

Name: Bob Williams
Email: rkw9000@gmail.com
Address: 5659 SW Texas St -
Portland, Oregon 97219

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project for Tacoma. As indicated in the IPCC report, climate change disaster is approaching with ever increasing speed. We cannot afford to devote more resources to old fossil fuel technology and must develop renewable energy sources ASAP!

We are well aware now of how much damage fracked gas is causing through leaks along the production and supply chain. It seems your analysis does not properly account for leaking gas over the short term and only uses a long term analysis. Our time is SHORT for addressing climate change!

The proposed project is a direct affront to the Puyallup Tribe, putting their treaty rights and community at risk first and worst. Their treaty rights need to be a primary consideration.

There is also concern that the whole facility will be treatened by rising sea levels resulting from climate change. That would be an ironic end to the project!

Please do not build this facility!
Thank You,
Bob Williams

0970-1 10. LCA Calculations
0970-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
0970-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
0970-4 14. LCA Inputs and Assumptions - Leakage/Slippage
0970-5 13. LCA Inputs and Assumptions - Natural Gas Source
0970-6 19. LCA Inputs and Assumptions - End Use
0970-7 14. LCA Inputs and Assumptions - Leakage/Slippage
0970-8 16. LCA Inputs and Assumptions - Hydraulic Fracturing

From: Eric Williams
To: Public Comment
Subject: Puget Sound Clean Air Agency ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 4:18:25 PM

Talking Points

These are just some of the shortcomings developed by a coalition of groups including Advocates for a Cleaner Tacoma (ACT), Sierra Club, 350 Seattle, Washington Physicians for Social Responsibility (WPSR) and 350 Tacoma. One could bring up any of these in a comment:

- **The Draft SEIS is Incomplete** – The current version of the draft SEIS does not contain all the information we, the public, need to fully assess the accuracy of this study and the predicted impact of the LNG facility. There are at least 10 places in the study that have "placeholder" values instead of actual data. We request that the PSCAA complete the draft SEIS, re-issue it, and then reset the public comment period so that we may better formulate our questions about this project.
- **SEIS is Using Outdated Methane Global Warming Potential Value** – They did not use the best available science for the Global Warming Potential (GWP) value for methane. GWP is a measure of potency for a greenhouse gas and it is measured against carbon dioxide (CO_2). CO_2 has a GWP value of 1. Methane, however has a much larger GWP value. They are using the 2007 value of 25 for the 100-year number (i.e. the value average over 100 years), whereas they should be using the 2016 value of 32. Everything else being equal, making this one modification in their models makes the LNG plant dirtier from a greenhouse gas emissions perspective than staying with the heavy fuel oil.

Report	20-year GWP	100-year GWP
2007 IPCC AR4	72	25
2013 IPCC AR5	86	28
2016 Scientific Study (authors include lead from 2013 study)	96	32

- **Analysis is based on 100-year, not 20-year, global warming potential (GWP) values** – They base all of their analysis on the 100-year GWP of methane, whereas, given the IPCC report that was released on Monday indicating that we must change our energy fuel mix in the next 12 years or face dire consequences in 22 years, they should be using the 20-year numbers, as that is the timeframe where action is needed. Using the most recent 20-year value of 96 makes the LNG plant 150% dirtier than the current capability.
- **Questionable claims that B.C. fracked gas is as clean as they claim –** They indicate that the fracked gas from B.C. has a much smaller leakage rate. However they fail to incorporate 2017 and 2018 analyses showing that a large percentage of the fracked gas wells are underreporting their methane leakages.
- **What assurances do we have that all of the fracked gas would come from BC?** They claim that all of the natural gas will be coming to the plant from British Columbia. However, just as we saw on Wednesday with the natural gas pipeline explosion in BC, they were able to use natural gas from North Dakota. The methane leak estimates from North Dakota are noticeably higher than those reported from B.C. We have no guarantees that the gas used would come from BC. Of note, per their 2017 10K filing with the Securities and Exchange Commision (SEC), in 2017 they obtained gas from British Columbia (54.8%), Alberta (19.1%) and the United States (26.1%).
- **Analysis assumes credit for extra maritime customers that currently do not exist –** The analysis appears to assume that Puget LNG (the for-profit arm of this venture that will be selling the LNG to maritime customers) already has additional maritime customers, and so is claiming greenhouse gas emissions reduction credit for them. They have no such customers and so cannot legitimately claim such credit.
- **Questionable Methane Slippage Rates for TOTE Vessels –** It appears that they are using smaller methane slippage rates (the amount of unburned methane that will escape into the atmosphere through the exhaust system) for the TOTE maritime vessels that will be burning the LNG. In fact, even in PSE's own greenhouse gas life cycle analysis that they completed and is provided as part of this report, their external peer reviewer questioned PSE's assumption on their methane slippage rate indicating that they should be using the higher rate as that is considered best practice.
- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells** – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Sent from Mail for Windows 10

1326-1 10. LCA Calculations
1326-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
1326-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
1326-4 13. LCA Inputs and Assumptions - Natural Gas Source
1326-5 19. LCA Inputs and Assumptions - End Use
1326-6 14. LCA Inputs and Assumptions - Leakage/Slippage
1326-7 16. LCA Inputs and Assumptions - Hydraulic Fracturing

From: Eric Williams
To: Public Comment
Subject: Puget Sound Clean Air Agency ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Wednesday, November 21, 2018 4:18:25 PM

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- **Analysis does not incorporate diesel emissions for transporting sand/water to the fracked wells** – Fracking requires large consumption of water and sand for its operations, however GHG emissions from these diesel trucks were not included in the analysis

Sent from Mail for Windows 10

1691-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 10:24:30 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

Joyce Williams
joyceluther52@gmail.com
93618

1302-1 22. General Opposition

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

RECEIVED
NOV 19 2018
Puget Sound Clean Air Agency

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Natalie L Williams

Address or email 10914 SE 287th St, Auburn, WA 98092

We may have anywhere from ZERO to 12 years to quit all Greenhouse Gases or Mankind Itself will CEASE to Exist in the next 20 - 30 years. <IPCC report>

It is unconscionable to proceed with the LNG Plant Knowing this!

EXTINCTION is FOREVER

Do BETTER by Your SPECIES!

Natalie Williams

copy: my files

2568-1 22. General Opposition
2568-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2568-3 13. LCA Inputs and Assumptions - Natural Gas Source
2568-4 7. SEPA Alternatives
2568-5 19. LCA Inputs and Assumptions - End Use
2568-6 10. LCA Calculations
2568-7 22. General Opposition

From: seachange3@everyactioncustom.com on behalf of Kathy Wilmering
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Tuesday, November 13, 2018 8:49:42 PM

Dear Puget Sound Clean Air Agency,

I am writing both as a member of Earth Ministry and as someone who believes our climate is at a dangerous tipping point. As a Seattle-ite I am writing because your decision will impact the course of similar decisions in this state. After looking at some of the findings of the SEIS, I have the following concerns:

1. It is inaccurate to use a 2007 value for methane's impact on climate when new data has been published as recently as 2 years ago. Then we have the recent United Nations report which underscores the urgency of addressing climate change. If you use the more appropriate 20-year Global Warming Potential benchmark, I understand that the plant then scores as 50% dirtier than currently scored.
2. There is no way to ensure that BC is the only methane source. And not surprisingly, independent studies report a much higher pollution rate than do the fossil fuel industry studies.
3. Port users like TOTE have already switched to alternative fuels and do not require LNG.
4. The SEIS itself states it needed more information from PSE. That alone should trigger a need for revision and another comment period, as it doesn't account for the full impact of climate change. Please be an effective steward for us.
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry/Washington Interfaith Power & Light, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for

2568-7 cont'd 5. Regulatory Framework

full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Kathy Wilmering
1900 N Northlake Way Ste 127 Seattle, WA 98103-9051

1375-1 22. General Opposition

From: Diana Winer
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Friday, November 16, 2018 8:23:15 AM

Name: Diana Winer
Email: winerdiana@gmail.com
Address: 2055 NE Holman Street -
Portland, Oregon 97211

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

No more fracking and greenhouse gases.

Steve: Next up is John Winkler.

John: Hi. I'm amazed you guys can still be up here without any beverages or anything like that. So, I commend you for that. My name is John Winkler. And I am a lifelong resident of this fine county. And I appreciate very much, especially at this late hour, you folks being here listening to all of us. Throughout much of my life, I have participated and witnessed what I consider to be the rebirth of Tacoma and much of Pierce County.

[05:58:08] Since I was a child, I remember very distinctly a Asarco and all of the rest of it. And I am very proud to say now that, through the efforts of many, many wonderful people, we've transitioned from a community with serious environmental challenges into a community that has cleaned up its polluted sites and created new, spectacular communities, on those sites, like Point Ruston and Thea Foss. I personally believe that, having observed this for as long as I have, TOTE's transition to the LNG is indeed in that same light. The Port of Tacoma has played a very important role in this process as well.

However, my purpose today is to stand up as a lifelong resident, a person who cares very, very deeply about the environment just as many, many other people in this room do, and as a lifelong Democrat, and to urge you to complete and issue the air quality permit for the LNG facility.

[05:59:06] All the scientific data says that this is what we should do for Pierce County. Climate change is a reality, and waiting is no longer an option. This project will help Tacoma and the region once again reach its transition to a cleaner and less polluting future. I believe very strongly that we must reward TOTE's incredible environmental leadership in the maritime industry and move forward with truly a generational shift to the cleanest fuel available. Finally, I would just say that I believe this is a very clear choice between the future and the past. And I hope that we can move forward. Thank you very much.

From: John Winkler
To: Public Comment
Subject: Public Comment LNG
Date: Wednesday, November 21, 2018 12:12:54 PM

November 20, 2018

To Whom It May Concern:

As a lifelong Pierce County resident, I have been able to witness and participate, to an extent, in Tacoma's rebirth. Tacoma has transitioned from a community with serious environmental challenges, to a community that cleaned up its polluted sites and created new spectacular communities on those sites like Point Ruston and Thea Foss Waterway. I see TOTE's transition to LNG in the same light.

The Port of Tacoma has played an important role in that process as well. However, my purpose as a lifelong resident, a person who cares deeply about the environment and as a lifelong Democrat is to urge the completion of the SEIS and issue the Air Quality permit for the LNG Facility. Why? Because **all** the data and science say to do so. Climate Change is a reality and waiting is no longer an option. This project will help Tacoma and the region once again in its transition to a cleaner and less polluting future.

What does the SEIS say? It says, this facility and TOTE's conversion to LNG will reduce greenhouse gases by 13.5%. Additional data says there will be reduction of:
Sulphur oxides by 100%
Particulate matter by 99%
Nitrogen Oxide by 90%

TOTE should be rewarded for their incredible environmental leadership in the maritime industry and we should move forward with truly a generational shift to the cleanest fuel available.

In conclusion, this is a choice between the future and the past. This project has been delayed long enough. Let me be clear, any rejection of this air permit takes our community backwards and will result in us using a much more polluting fuel source. Approval of this Air Permit moves us forward with the cleanest fuel source available.

Don't follow the politics. Go with the overwhelming amount of data and science and let's get on with building a less polluting maritime fleet powered by LNG. In many aspects, TOTE's conversion to LNG is about doing our part right here in area code 253 to protect the planet.

Sincerely,

John Winkler

1124-1 22. General Opposition

Christopher: Thank you. For the record, my name is Christopher Winters. I'm a resident of Tacoma as of 1992, after spending just under 10 years in the United States Army.

[01:21:00] I was born on the Osage Reservation in Oklahoma. I'm an enrolled member of the Creek Nation and a proud resident of Tacoma, which I do call my home. And I do respect the Puyallup Tribe's position as a sovereign nation and a lot of the people here talking about jobs and our environment, in an open public forum. I'm not one to kick the can down the road and continue to talk about clean energy. When I go down to the bay, and I watch the ships that have come in and out and in and out and belching fossil fuels into the air, I grew up on the reservation. I worked in the oil industry growing up.

I know exactly what happens. I went home to Oklahoma in February to bury my mother, and I saw what the environment has turned into, when you don't consider cleaner energy solutions. I went back in September. And that was to lay another family member to rest, my little brother that served in the US Navy that's trying to convert its ships to a cleaner source of energy.

[01:22:03] That leads me to a story of this Puget Sound region. I am in the construction trades. I was assisting a local employer who, a good number of years ago, right down on the tide flats, was introducing a hybrid vessel to meet the Navy's requirement to 50% reduction in its reliance on foreign fossil fuels. If you want to see where that employer is sitting today that shipyard isn't there. That is the most expensive weather vane in the city of Tacoma. It just swings free in the air. The banner that hung on the side of the building talking about that vessel is peeling away like the leaves on the trees.

If we continue to kick the can down the road and talk about clean energy, we're going to end up with what I saw, when I went home, which is nothing. The environment and the jobs both are suffering. So, I think we need to not only work together to, if we have to revise the SEIS, then, we revise it.

[01:23:06] But we have to work together to actually become less reliant on foreign fossil fuel and less reliant on our fossil fuel. Like I said, I grew up in the oil industry. I joined the military, not out of a sense of patriotism, which was a part of my family, but when it went from $33.00 a barrel to $9.00, and people were hanging themselves. I traveled the globe. I've been to third world countries where they don't even address climate change. They don't address

clean energy. And I see what their environments are like. I lived in the sands of Iraq during the burning of the oil wells. And I sat in that every night.

And I woke up to it every day. So, if we continue to kick the can down the road, we're going to end up with what we have got, which is nothing. So, let's move forward.

[01:24:00]

Carole: Thank you. So, the next group of five is Kat Wood, Penny Rowe, Vincent O'Halloran, Ronald Snell, and Laura Skelton. So, Kat Wood is first.

Kat: Hello. My name is Kat Wood, and I'm a healthcare professional here today in solidarity with Washington Physicians for Social Responsibility. Thank you for taking the time to hear from us. In order for your agency to promote clean air, proper evaluation of possible pollution must be fairly and accurately assessed through rigorous scientific means and methods.

[02:12:05] The SEIS provided uses outdated standards to assess the global warming potential of methane and nitrous oxide, which then affects the conclusions in its analysis. The SEI draft only gives us information on methane emissions on the 100 year time table. We have a little over 30 years to stop all greenhouse gas emissions, according to the recent report from the United Nations. Methane emissions, over the short term, must be assessed, in regards to the rapidly advancing global climate shift. Methane emissions are 86 times more potent than carbon dioxide as a greenhouse gas.

And two-thirds of methane is extracted using an environmentally hazardous process known as fracking. We are at a tipping point and should be working to lessen greenhouse gas emissions not giving a green light to a project that would release hundreds of thousands of tons of greenhouse gas.

[02:13:01] I oppose the LNG facility because our greenhouse gas emissions will be worse than if we didn't have the facility at all. The SEIS given is outdated and misleading and ignores cumulative emissions that may have a large greenhouse gas impact. The SEIS inaccurately assumes that there are no alternatives to the proposed LNG plant, when there are other options available to meet emission standards that should be considered. Residents of Tacoma deserve an accurate, complete, and scientifically accurate SEIS and then, given time to comment, based on the information necessary to make such decisions for our futures. Thank you.

1165

1165-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
1165-2 7. SEPA Alternatives

2242-1 10. LCA Calculations
2242-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2242-3 10. LCA Calculations
2242-4 13. LCA Inputs and Assumptions - Natural Gas Source
2242-5 11. LCA Inputs and Assumptions - General

From: Sara Wood
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Sunday, November 18, 2018 11:06:41 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

I am a Tacoma resident concerned about climate change and our contributions to global warming. Part of what makes Tacoma so special is its story of moving from a legacy of pollution to a community that can take pride in its industry and environment. Unfortunately, I am personally impacted daily by the rising accumulation of toxins in my neighborhood from the Port of Tacoma. I can visually see the plumes from businesses and also have an air monitor in my neighborhood. You can look on Purple Air and look at the Pointe Woodworth neighborhood. If you type in PWW on the map link it will show you real time air quality.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

Sara Wood
Saraewood@hotmail.com
1834 Pointe Woodworth Dr NE
Tacoma, Washington 98422

0737-2 8. No Action Alternative
0737-2 14. LCA Inputs and Assumptions - Leakage/Slippage
0737-3 12. LCA Inputs and Assumptions - Global Warming Potential Value

PUBLIC SOUND ENERGY – LNG FACILITY TACOMA

Draft Supplemental Environmental Impact Statement

ATTN: Public Comment on DSEIS, PSE LNG Project

Gretta Woodlock 1015 N Sheridan Ave Tacoma, WA 98403

grettaw3@gmail.com

RECEIVED
NOV 13 2018
Puget Sound
Clean Air Agency

Thank you for the opportunity to share my thoughts on the construction of PSE LNG facility in the Tacoma tide flats.

Fracked gas is now the big climate fight in Washington State and especially in Tacoma currently. Two-thirds of all gas produced in the US is fracked, therefore there is nothing "natural" about gas anymore. The introduction of fracking has transformed the industry and made fracked gas into one of the largest threats to our climate. It may produce less carbon emissions when burned, however, **the production, processing, storage, transmission, and distribution of fracked gas leaks into the atmosphere immense amount of methane, which is a much more destructive pollutant for our climate than carbon dioxide. When methane is leaked directly into the atmosphere, it is 36 times more powerful at trapping heat than carbon dioxide when its impact is averaged over a 100 year period. Over a 20-year period, methane's heat-trapping impact is 87 times more powerful than that of carbon dioxide!!**
In overseeing the PSE LNG project, your track record lags. Yes, the Agency issued a Notice of Violation to PSE when it started construction **without** following protocol and process required by your agency. Civil penalties do not match the severity of the implications of the applicant's disregard for proper process. This violation should be considered in evaluating the applicant when determining if they should receive the air permit. This entire time, PSE has built a massive facility ***without a major permit***. Can they be trusted to uphold any conditions that come with an issuance of the air permit? PSE's blatant disregard for public process is undeniable. Do not let them bully their way into operating this facility.

Puget Sound Clean Air Agency has promised these following commitments on their website:

- Be good and wise stewards of the resources you give us
- Defend the future
- Prevent and reduce risk to citizens by upholding and enforcing the law
- Protect citizens from air pollution
- Tell citizens what is in the air they are breathing

There is no way for Puget Sound Clean Air Agency to uphold these commitments unless they deny the air permit for the LNG facility.
The danger of having PSE LNG facility in the city of Tacoma where thousands of citizens are within 1-3 mile radius (danger zone) is unconscionable.

Seriously, please consider putting monies and human energy into further developing solar energy, our power in the hopefully not too far future. ***Solar energy is the healthy way to ensure clean air now and into the future.***
Thank you.

2248-1 10. LCA Calculations
2248-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2248-3 10. LCA Calculations
2248-4 13. LCA Inputs and Assumptions - Natural Gas Source
2248-5 11. LCA Inputs and Assumptions - General

From: CHRIS WOOTEN
To: Public Comment
Subject: Tacoma LNG SEIS
Date: Friday, November 16, 2018 4:06:27 PM

Puget Sound Clean Air,

Thank you for providing the opportunity to review and comment on the PSE Tacoma LNG SEIS.

As a resident living near the shores of Puget Sound and adjacent to the Port of Tacoma, I am highly interested in how the waters and environment are continuing to be cleaned up and made even cleaner based on decisions by responsible companies in the Port, and enlightened, visionary City and Port officials. To ensure the environment remains in a state of constant improvement is all of our responsibilities and ought to elevated to an even higher priority on City, Port and company officials daily agendas.

After reading the SEIS, it appears to use old information, and it's missing data. The SEIS should be using the latest IPCC numbers when determining the global warming potential of greenhouse gases. It should also use the 20-year numbers instead of the 100-year, since this plant will only be operational for 40, and we'll see big impacts from the very beginning. When the 20-year GWP from the 2013 IPCC report is used, it shows that emissions from the LNG facility are actually 30-31% worse than the No Action alternative.

The SEIS is also missing really important information, like the carbon content of the gas to be used. This data is needed for a complete study, and until it's there, this SEIS is incomplete.

How will PSCAA ensure that the methane gas comes from BC? The SEIS should also analyze the very likely scenario in which PSE will have to get its methane gas from the Unites States network.

Finally, the SEIS doesn't include smaller sources of emissions, like those from tearing the plant down. These smaller sources of emissions could add up to a big impact, and should be included in the analysis.

Because of these conclusions, I am adamantly opposed to the PSE Tacoma LNG project. Please update the SEIS, reissue it when it is complete and credible, and then re-open the comment period.

CHRIS WOOTEN
chriswooten@earthlink.net
507 Le-Lou-Wa Pl NE
Browns Point, Washington 98422

2204-4 12. LCA Inputs and Assumptions - Global Warming Potential Value
2204-4 13. LCA Inputs and Assumptions - Natural Gas Source
2204-4 7. SEPA Alternatives
2204-4 7. SEPA Alternatives

From: rw.moonlight@everyactioncustom.com on behalf of Rachael Wooten
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Sunday, October 21, 2018 12:55:19 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

My reading and following of the issues around methane release and its relationship to fracked gas has led me to the same conclusions that follow in detail in this letter. Therefore I URGE you not to approve this climate threatening project, which also harms the nearby Puyallup Tribe.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Rachael Wooten
Raleigh, NC 27608
rw.moonlight@earthlink.net

1790-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Thursday, November 15, 2018 11:37:32 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Sincerely,

stephen wright
fst3503@gmail.com
98501

1501-1 22. General Opposition

From: Jan Wulling
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:22:16 PM

Name: Jan Wulling
Email: homeharmonynow@yahoo.com
Address: 1822 NE 60 th Ave -
Portland, Oregon Oregon

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

I know the dangers of fracked gas, and anywhere in the Northwest is too close for me. Please hear this, "no" to any fracking. Humans are more creative than that.
Thank you!

1690-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Wednesday, November 14, 2018 7:30:18 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Stop the madness...
Are you in the blast zone?
Why they working without permits... not another,DAPL
NOLNGIN253

Sincerely,

Robyn Wynn
gurluvgod@gmail.com
98503

1745-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Saturday, November 17, 2018 7:40:51 AM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

Please stop the madness, love our mother Earth as we only have one
Thank you for your time
~Robyn~

Sincerely,

Robyn Wynn
gurluvgod@gmail.com
98503

0432-3 22. General Opposition
0432-3 5. Regulatory Framework
0432-3 3. Outside of SEIS Scope

Puget Sound Energy - LNG Facility Tacoma
Draft Supplemental Environmental Impact Statement

Submit comments by November 21, 2018

publiccomment@pscleanair.org

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

All comments received by the agency are reviewed and considered equally, whether received in writing, via email, or verbally at the public hearing. The Agency will respond to the comments in writing and send the responses to anyone who submitted a comment when the comment period is finalized, all comments have been reviewed, and responses prepared.

Note: All comments received during the comment period become part of the public record.

Name Scott A. Yoos

Address & email 4500 Martin Way E., Spc. #35
Olympia, WA 98516-6307.
e-mail:
scottyoos@hotmail.com

- I rode the transit buses up here today, because I know the critical importance of stopping PUGET SOUND ENERGY's fatally short-sighted pro-LNG (ie- Fracked Gas) facility/project. It is SHAMEFUL that this (primarily foreign-owned) corporation has completely ignored the historical Native Treaty Rights & has stubbornly bull-dozed over all of our rights by proceeding w/ this Danger-filled project. =>

Geologically-speaking, we are known to live in earthquake-prone region. This is NOT the wisest place to site an explosive 'bomb', in such a densely populated area.

- We, as a species, need to immediately evolve away from relying heavily upon the use of dirty fossil fuels (incl. L.N.G.) & embrace the wisdom of (now existant) cleaner & greener energy alternatives!

1670-1 22. General Opposition

From: John Young
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 11:25:42 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

I'm too busy to make substantive comments specific to this particular LNG project.

However, as a member of SAVE RGV from LNG sine May 2014, I've sliced and diced LNG issues six ways from Sunday and strongly suggest you slice and dice it into oblivion bye bye gone for good.

In May 2014 we learned LNG export operations were targeting our local Port of Brownsville TX, next door to South Padre TX and the Laguna Atascosa National Wildlife Refuge. We were told LNG was good, all good, no bad. Looking into it, we decided different. Then we were told it was a done deal, all the elected officials lined up behind it, big money pushing it forward, just the way things have always been done in our small impoverished backwater part of the world.

Then in 2015, four local communities passed resolutions opposing LNG: Port Isabel, Laguna Vista, South Padre Island, and Long Island Village. A number of local groups as well. Nothing like that had ever happened here before.

Rio Grande LNG (joined at the hip with Rio Grande Pipeline), Annova LNG, and Texas LNG were all supposed to be FERC approved and good to go in 2017.

But the local opposition pushed possible approvals back to 2019. For example, we forced a March 2018 Texas Commission for Environmental Quality Public Meeting here regarding Rio Grande LNG's TCEQ air quality permit request. 185 people attended the meeting. 42 of those attending made oral statements on the permit request, overwhelmingly opposing the permit. 2,003 written comments were submitted and requests for Contested Hearings on the permit were submitted by Port Isabel, Laguna Vista, Vecinos Para el Bienestar de la Comunidad Costera, Shrimpers and Fishermen of the RGV, and SAVE RGV.

Also in March 2018, SAVE RGV from LNG, Lower Rio Grande Valley Group of the Sierra Club, Friends of the Wildlife Corridor, the Laguna Madre Foundation, and Frotera Audubon submitted a letter to the Corps opposing the Lower Texas Coastal Mitigation LLC project (SWG-2018-00235) that proposed to do business with the LNG companies needing wetlands mitigation for their proposed projects at the Port of Brownsville.

I'm too busy to say much more because our US Army Corps of Engineers filing deadline for opposing Rio Grande LNG's Section 404 permit request was 11-19-2018. My 77th birthday is 11-23-2018. Our deadline for filing comments against FERC's Rio Grande LNG Draft Environmental Impact Statement is 12-03-2018. Our deadline for filling comments against

Texas LNG's Section 404 permit request is also 12-03-2018. Our deadline for filing comments on FERC's Texas LNG Draft EIS is 12-17-2018. And FERC's scheduled to issue its Annova LNG Draft EIS this December.

For more information about how many of us are fighting LNG so hard and why, check our website at www.savergvfromlng.com/ and our Facebook page at https://www.facebook.com/saveRGVfromLNG/.

They say LNG stands for Liquified Natural Gas. We say it stands for Lies 'N' Greed.

Don't let the LNG folks get a single foot wedged in your door. They're like boll weevils, worse than lice in you hair. They'll take what you give them and then be back again and again for more and more of your small piece of the world and more and more regulatory slack allowing them to cloud your sky and damage your lungs.

Take care,

John Young, MS (Psychology), MSW (Social Work), Retired
San Benito TX

John Young
ForJohnAndBarbara@gmail.com
34515 FM 1577
San Benito, Texas 78586

1692-1 22. General Opposition

From: 350 Seattle
To: Public Comment
Subject: Puget Sound Energy's LNG facility
Date: Tuesday, November 13, 2018 10:18:41 PM

Dear Puget Sound Clean Air Agency,

Thank you for opening up this review process and for your careful consideration of all the impacts of Puget Sound Energy's proposed LNG facility. I'm writing to express my opposition to the project and express significant concern.

PSE's fracked gas LNG facility is being built on Puyallup land without their consent. Honor the Treaties, and reject the Clean Air Permit for this dirty project!

Sincerely,

Ronald Zastovnik
ronzastovnik@gmail.com
93629

1305-1 14. LCA Inputs and Assumptions - Leakage/Slippage
1305-2 3. Outside of SEIS Scope
1305-3 5. Regulatory Framework

From: Bob Zeigler
To: Public Comment; Betsy Wheelock
Subject: Comment for Hearing and DSEIS Tacoma LNG
Date: Monday, October 29, 2018 3:42:40 PM
Attachments: Bob Zeigler Tacoma LNG Comment.pdf

Below and attached is my written comment to your DSEIS on Tacoma LNG Plant.

Thank you,

Bob Zeigler

Sent from Mail for Windows 10

October 29, 2018

Carole J. Cenci, SEPA Responsible Official
Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Dear Ms, Cenci,
Thank you for the opportunity to comment on your DSEIS: Tacoma Liquefied Natural Gas Project (including TOTE Marine Vessel LNG Fueling System) proposed for E 11th Street in Tacoma. I am providing these written comments for both your October 30th Public Hearing and my comment on your draft.

Your draft states (page 2-1 and 4-10) that burning natural gas releases less green house gas than burning deasil or other fossil fuels by ships and that Canada in 2020 will upgrade pipelines to reduce fugitive leaks. However, it seems it would also increase amounts of natural gas piped and stored and there would be cumulative leaks and potential for catastrophic releases as well as increasing fracking in Canada with this project.

Your draft was issued the same day of UN Climate Scientists IPCC Report pointing out the seriousness of greenhouse gas emissions and need to cut those emissions almost in half in 11 years (2030) and entirely within 30 years (2050) to avoid catastrophic consequences. This shows us that fossil fuel best management practices are not going to be sufficient. Your draft came out a day before the Embridge Ink pipeline leak and explosion near Prince George, British Columbia forcing about 100 Lneida First Nations people from their homes. That is the existing BC pipeline that supplies two thirds of PSE's Natural Gas. It seems that 145 mile natural gas pipeline in areas that are seismically active contains potential risks not analyzed in the Draft. Also not analyzed for geologic risk was the location on the Tacoma tideflats where there could be increased risks of both earthquake and Mt. Rainier lahar. https://www.usgs.gov/media/images/mt-rainier-lahar-hazard-map. Hopefully your final will address these issues.

Another impact not analyzed was impact upon Puyallup Nation and their Treaty Rights. Tribal opposition of this project has been clear and consistent. Cultural impacts need to be addressed in your final.

Thank you for the opportunity to comment.

Sincerely,

Bob Zeigler
1102 A Creekwood Ct. SE
Olympia, WA 98501
(360) 570-0848
zeiglerbob@msn.com

October 29, 2018

Carole J. Cenci, SEPA Responsible Official
Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS, PSE LNG Project
1904 Third Ave, Suite 105
Seattle, WA 98101

Dear Ms, Cenci,

Thank you for the opportunity to comment on your DSEIS: Tacoma Liquefied Natural Gas Project (including TOTE Marine Vessel LNG Fueling System) proposed for E 11th Street in Tacoma. I am providing these written comments for both your October 30th Public Hearing and my comment on your draft.

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Another impact not analyzed was impact upon Puyallup Nation and their Treaty Rights. Tribal opposition of this project has been clear and consistent. Cultural impacts need to be addressed in your final.

Thank you for the opportunity to comment.

Sincerely,

Bob Zeigler

Bob Zeigler
1102 A Creekwood Ct. SE
Olympia, WA 98501
(360) 570-0848
zeiglerbob@msn.com

1981-1 23. General Support

From: Kyle Zender
To: Public Comment
Subject: PSE LNG Facility in Tacoma, WA
Date: Tuesday, November 20, 2018 1:07:17 PM
Attachments: image001.jpg

I wish to express my support for Puget Sound Energy's (PSE) liquefied natural gas (LNG) facility. This specifically includes my concurrence with the conclusion about the environmental benefit of replacing transportation diesel fuel with clean burning LNG contained in the October 8, 2018 Draft SEIS issued by the Puget Sound Clean Air Agency (PSCAA) and my support for the agency in issuing the necessary permit(s) for the project to proceed.

The Washington Department of Ecology's State Environmental Policy Act (SEPA) regulations recognize that air quality is a part of the environment. It's hard to ignore the significant environmental and air quality benefits of replacing diesel or bunker fuel currently used by the maritime industry with LNG fuel. Switching from diesel to LNG reduces greenhouse gas emissions by nearly 15%, sulfur dioxide (SOx) emissions by over 99% percent, and nitrogen oxide (NOx) emissions by nearly 85% while eliminating visible particulate matter (PM) produced by ships by more than 85%. It is these particulate emissions that are extremely harmful to the lung health of anyone breathing them in.

It is also important to note that LNG powered ships will substantially exceed the North American Emission Control Area requirements established by the International Marine Organization's (IMO). The IMO regulations have required a reduction in the fuel sulfur content from 3.5 percent to 0.5 percent. Both US EPA and the Coast Guard are enforcing these fuel regulations which have been estimated by EPA to reduce mortality by as much as 30,000 people per year. TOTE has made the commitment to use LNG fuel, which provides substantially greater benefits than even the IMO regulations mandate.

Another important environmental advantage of LNG as fuel is that in the unlikely event of a spill, LNG turns into vapor and dissipates with no lasting effects on water or marine life.

The LNG facility will also generate important economic benefits for all South Sound residents. In addition to helping local employers like TOTE remain competitive, it will create at least 250 construction jobs and over 300 indirect jobs due to the construction. After the construction, the economic activity from the project will create another 125 permanent jobs.

The draft SEIS, prepared by Ecology and Environment, Inc. and released by PSCAA on October 8, 2018, stated "When evaluating direct, upstream, and end use GHG emissions, replacing a diesel propulsion engine with a pure LNG propulsion engine results in reduced life-cycle GHG emissions."

Since the draft SEIS independently prepared for and published by PSCAA has confirmed the

environmental benefits and overall reduction in GHG emissions from use of LNG as a replacement for diesel, I fully support PSCAA promptly finalizing its October 8, 2018 draft SEIS and granting the necessary permit(s) so the LNG facility can be completed as soon as possible.

Kyle Zender
Construction Manager

Western Refinery Services, Inc.
Cell: (360) 510-5720
Office: (360) 366-3303
www.wrsweb.com

1514-1 22. General Opposition

From: Tricia Zigrang
To: Public Comment
Subject: ATTN: Public Comment on DSEIS, PSE LNG Project
Date: Tuesday, November 20, 2018 8:17:42 PM

Name: Tricia Zigrang
Email: tazigrang@yahoo.com
Address: 6913 SW Windemere Loop -
Portland, Oregon 97225

Comment:

Dear EFSC Chair Beyeler, and Council Members Dowlin, Grail, Jenkins, Senn, Billings, and Roppe

This terminal is a HUGE mistake. We are trying not to go extinct. Any new project devoted to fossil fuel infrastructure is a step backwards. Please consider the planet and stop this travesty!

Steve: Next up is Jessica Zimmerle.

[04:23:00]

Jessica: Hi. My name is Jessica Zimmerle. I am the program and outreach director of Earth Ministry and Washington Interfaith Power and Light. We're a statewide organization that engages people of faith on environmental issues. And recently, Earth Ministry was honored to stand behind the Puyallup Tribe in opposition to this dirty and dangerous project. Over 90 clergy in our network signed a letter of support for the Puyallup and 14 other tribes who had called for a stop work order on the plant earlier this year. That letter was delivered in person by a rabbi and a pastor to the governor's office.

I bring it up today to share an excellent quote from a local faith leader from Tacoma who signed on. He wrote that, "My faith teaches me to be trustworthy. And so, I believe we just honor the Puyallup Tribe's treaty rights. My faith teaches me to love neighbors. And so, I believe we must protect the health of all people who live in the Tacoma area."

[04:24:00] "My faith teaches me to care for creation. And so, I believe we must find alternatives to dirty fossil fuels." This quote sums up our main concerns about this project. And it's what I keep hearing over and over from members of the faith community I work with. We must respect the treaty rights of the Puyallup. We must protect the health and wellbeing of our neighbors. And we must be good stewards of God's creation. The draft does not provide reassurance that this project does any of the above. We're concerned the study does not use best available science, nor the near term 20 year timeline for evaluating global warming potential.

We're dubious of the assumption that fracked gas would only be sourced from Canada. We know methane leaks at higher rates than used. And that the no action alternative doesn't have to be the status quo. There are other options. It would be unethical to move forward with this permit, if the draft remains in its current state. Please thoroughly edit the draft and release it for full public comment.

[04:25:03] Thank you.

Steve: Thank you. Jan Ruud?

1153-2 8. No Action Alternative
1153-2 14. LCA Inputs and Assumptions - Leakage/Slippage
1153-3 13. LCA Inputs and Assumptions - Natural Gas Source

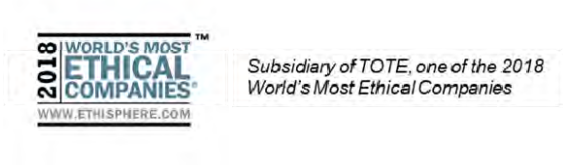
From: Stuart Zimmerman <SZimmerman@totemaritime.com>
Sent: Wednesday, October 31, 2018 2:21 PM
To: Public Comment
Subject: Puget Sound Energy - LNG Facility Tacoma Public Comment
Attachments: Tacoma LNG Facility Public Comment S. Zimmerman.pdf

Puget Sound Clear Air Agency,

Please accept the attached comment.

Stuart

Stuart Zimmerman | Regional Sales Manager | **TOTE Maritime Alaska**
32001 32nd Avenue S Suite 200 Federal Way, WA 98001 | O: 253.449.8194 | C: 253.495.0311 |www.totemaritime.com
You are a valued customer – give us your feedback: Click Here



October 31, 2018

Dear Puget Sound Clean Air Agency,

I appreciate the opportunity for my comments to be heard in-regards to the LNG Facility in Tacoma. My name is Stuart Zimmerman, Regional Sales Manager for TOTE Maritime Alaska. My career with TOTE Maritime Alaska started in 2011 in Fairbanks, Alaska. I have had the proud opportunity for the past five years to call the Greater Puget Sound Region home.

One of the strongest reasons I continue to embrace working for a company as TOTE Maritime Alaska is due to their Environmental Stewardship and Community Minded Focus that is exemplified. TOTE Maritime Alaska support the communities we live and serve through donations, volunteerism and offering a reliable service offering that Alaskans have come to depend on. TOTE Maritime Alaska has made significant investments in the environment by building the cleanest most environmentally friendly vessel in the trade that offer a life-line to Alaskans on a weekly basis serving as the gateway between Puget Sound region and Alaska. Rain Gardens have been installed on our terminal in Tacoma to help mitigate pollution and water conservation. Shore side power is offered at our Tacoma facility allowing our vessels to run off shoreside power while in port offering reduction in emissions while in port.

The embarkment of our LNG Conversion project in 2012 was and has been focus doing the "right thing" for our environment. LNG is a much cleaner fuel than bunker fuel which is current source of fuel for majority of Maritime companies worldwide, LNG lowers greenhouse gas emissions: Reducing sulfur emissions by 100% and diesel particulate matter by more than 90%. The environmental benefits of switching to LNG are real and they underscore the unfortunate reality that remains leaving diesel as the only option as status quo.

It's essential we keep the Puget Sound sector competitive with ports around the world that are already embarking on building LNG Facilities and offering LNG as a viable fuel source for Maritime companies.

This project is very important for Tacoma, Puget Sound and the Maritime Industry. It's important that we mitigate any further delay in granting the air permit for the Tacoma LNG. Let's embark on a path forward together that supports benefits across our Puget Sound region, Tacoma and Maritime Industry.

I'm extremely proud to work for a company such as TOTE Maritime Alaska that supports environmental focus and the best interest of the communities we live and serve. I'm even more proud of how TOTE Maritime Alaska has embraced my family in my career and a company I hope my two children can work for some day.

Sincerely,

Stuart Zimmerman

TOTE Maritime Alaska | 32001 32nd Avenue S., Suite 200, Federal Way, WA 98001 | P: 253.449.8100 | F: 253.449.8225 | www.totemaritime.com

0622-1 3. Outside of SEIS Scope

Dear Port of Kalama, and Cowlitz County,
Dear Puget Sound Clean Air Agency,

I am concerned about expansion of methanol + LNG. Right now we are experiencing the devastating loss of salmon runs + starvation of orcas. Both these iconic animals are what we think of and love here in the Pacific NW.

The impacts of a methanol spill, additional tankers, along w/ already warming waters will denegrade + endanger the entire ecosystem. Please include the full impact of these projects on our water + wildlife depends on our rivers.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Jan Zuckerman	Email: ses_janze@yahoo.com
Address: 2914 NE 18th Ave. Ptld, OR 97212	Phone: 503-481-7033

Carole: Thank you. David Bean? Do we have David Bean? Jan Zuckerman?

Jan: Thank you for the opportunity to speak today. My name is Jan Zuckerman. I'm a retired teacher and a youth mentor. Yesterday morning, I attended a youth led rally for the climate.

[00:47:05] The words of the students drove me to be here today. Naomi, a 10-year-old student, spoke of the dangers of fracked gas. She said, "Though it seems like a good idea in the short term, fracking creates lots of jobs, but it can cause health problems such as coughing and wheezing and shortness of breath for people who live near fracked wells. And it keeps us dependent on fossil fuels, which leads for more climate change. Sometimes," she says, "adults in big industries like fracking don't think about the next generation. And that can be a huge problem that causes lots and lots of pollution in the air and water. And this pollution leads to climate change, which will largely affect our generation."

Catalina, an eighth grader, spoke about the need to co-exist and shared her concern that our obsession over money and extraction of coal, oil, and gas is poisoning us.

[00:48:00] She says that we have to change our perspective by not seeing the earth merely as a natural resource but as our nurturing mother that we must care for and love. Solomon, a 17-year-old, said, "Climate change isn't scary. Climate change is terrifying. It is so blood curdling horrifying that the world would rather ignore it than face it head on." Solomon wanted me to ask you will you ignore it. Will you allow Puget Sound Energy to put people's lives at risk, disregarding science and the human right to a clean atmosphere without volatile organic compounds poisoning their bodies?

Will you allow Puget Sound Energy to pretend that LNG is cleaner than coal, when the scientific fact is that, when methane leaks into the atmosphere, it is 86 times more powerful at trapping heat than CO_2 in a 20 year period.

[00:49:02] If we do not stabilize our climate now, we will be faced with an ecosystem collapse, in our lifetime. This means we cannot afford to invest in any new fossil fuel infrastructure. This coral that I hold before you, right now, today, cannot speak nor can it compete with the fossil fuel industry. Its fate and the fate of one-quarter of all of the ocean fish species who depend on coral is in your hands. And what about the animals that depend on these fish species? What

1147-2 22. General Opposition
1147-2 12. LCA Inputs and Assumptions - Global Warming Potential Value

about Naomi, Catalina, and Solomon and the children who are yet to be born?

Are we okay with telling them that we are willing to face disaster the likes of which humanity has never seen, so that Puget Sound Energy can make money? I implore your agency to say no.

Dear Port of Kalama, and Cowlitz County,

Dear Puget Sound Clean Air Agency,

I am concerned about expansion of methanol + LNG. Right now we are experiencing the devastating loss of salmon runs + starvation of orcas. Both these iconic animals are what we think of and love here in the Pacific NW.

The impacts of a methanol spill; additional tankers, along w/ already warming waters will denegrade + endanger the entire ecosystem. Please include the full impact of these projects on our water + wildlife depends on our rivers.

Please include this impact in the Final Supplemental Environmental Impact Statement.

Name: Jan Zuckerman	Email: ses_janze@yahoo.com
Address: 2914 NE 18th Ave. Ptld, OR 97212	Phone: 503-481-7033

2164-1 3. Outside of SEIS Scope

2164

1669-1 22. General Opposition

From: Nancy Zwicker
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 11:51:37 AM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

Please do not support fracking in any way. We need to focus on clean, renewable energy sources.

Nancy Zwicker
nancyzw@gmail.com
35825 SE 311th St
Ravensdale, Washington 98051

2532-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2532-2 13. LCA Inputs and Assumptions - Natural Gas Source
2532-3 7. SEPA Alternatives
2532-4 7. SEPA Alternatives
2532-5 5. Regulatory Framework

From: rhess3@everyactioncustom.com on behalf of Rachel Hess
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, November 21, 2018 8:24:39 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper. This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels.

Fracked gas is not a lesser evil. Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood.

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis. Thank you.

I urge you to revise the analysis to account for the following:

1. Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year).

2. Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated.

3. Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency.

4. Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals. This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG.(2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters.(3)

5. This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application.

Thank you for your time and consideration of these comments.

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017.
(2) https://www.researchgate.net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en.nabu.de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships.pdf

Sincerely,
Rachel Hess
Luckey, OH 43443
rhess3@rockets.utoledo.edu

2533-1 10. LCA Calculations
2533-2 12. LCA Inputs and Assumptions - Global Warming Potential Value
2533-3 12. LCA Inputs and Assumptions - Global Warming Potential Value
2533-4 6. Purpose and Need
2533-5 13. LCA Inputs and Assumptions - Natural Gas Source

From: Terri Lovins
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 11:11:25 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings

show they relied on gas from BC, Alberta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

Terri Lovins
terlovins@gmail.com
4902 30th Ave S
seattle, Washington 98108

2533-6 13. LCA Inputs and Assumptions - Natural Gas Source
2533-7 14. LCA Inputs and Assumptions - Leakage/Slippage

2534-1 12. LCA Inputs and Assumptions - Global Warming Potential Value
2534-2 13. LCA Inputs and Assumptions - Natural Gas Source
2534-3 7. SEPA Alternatives
2534-4 1. Determination of SEIS Scope - Comparison to FEIS
2534-5 10. LCA Calculations
2534-6 5. Regulatory Framework

From: shary50@everyactioncustom.com
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Friday, October 26, 2018 5:56:54 PM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities. My values of stewardship, justice, and responsibility have compelled me to comment on this project.
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats.

As a member of Earth Ministry, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project.

Please address the following in the Tacoma LNG SEIS:

1. Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016. Using the best available science shows the plant would have higher greenhouse gas emissions. Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades.

2. Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable. In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry. It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry.

3. Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements. The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use.

4. Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway. The SEIS should instead provide an analysis using only secured customers.

5. Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow. The draft SEIS should be thoroughly edited and released for a new full public comment period.

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal. With missing data and alterations to the project, this draft SEIS does not account for full climate impacts.

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources. Please re-start this review with complete information and additional opportunity for comment.

Thank you for caring for creation and our community.

Sincerely,
Ms Shary B
1950 Alaskan Way Seattle, WA 98101-1075

2621-2 General Opposition
2621-2 Outside of SEIS Scope
2621-3 LCA Inputs and Assumptions - Natural Gas Source
2621-4 LCA Inputs and Assumptions - Global Warming Potential Value

Dear Puget Sound Clean Air Agency,

Puget Sound Energy is willing to sacrifice community health and safety, ratepayer money, and Puyallup Tribal land for a liquefied natural gas (LNG) facility that we do not need.

We know that two thirds of "natural" " gas is fracked, and that fracking is a dirty and environmentally hazardous extraction process that emits a pollutant called methane. When properly accounting for methane leaks, fracked gas has climate impacts that rival those of coal.

The analysis of life cycle emissions associated with natural gas must assume a 3 percent overall leakage rate of methane from the time gas is fracked to when it reaches its destination. And the climate-disrupting impact of methane must be calculated at 87 times greater than that of carbon dioxide.

Thank you for realizing the original environmental impact statement was inadequate and for conducting this further analysis to help protect public health and safety. Please produce an accurate environmental review that reflects the true hazards fracked gas has on our air and climate.

First Name [redacted] Last Name [redacted]
Phone [redacted] Email [redacted]
Street [redacted] City [redacted] State [redacted] Zip Code [redacted]
◉YES! I want to attend the BIG public hearing on October 30th. Contact me about the time/location.
○YES! I want to volunteer to save our community and climate from fracked gas.

[redacted]
First Name [redacted] Last Name [redacted]
Phone [redacted] Email [redacted]
Street [redacted] City [redacted] State [redacted] Zip Code [redacted]
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Phone [redacted] Email [redacted]
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First Name [redacted] Last Name [redacted]
Phone [redacted] Email [redacted]
Street [redacted] City [redacted] State [redacted] Zip Code [redacted]
○YES! I want to attend the BIG public hearing on October 30th. Contact me about the time/location.
○YES! I want to volunteer to save our community and climate from fracked gas.

Please scan signed comments and attach it with an email either to carol@350tacoma.org or victoria.leistman@sierraclub.org or mail it to Sierra Club, 180 Nickerson Street, #202, Seattle, WA 98109.

If possible, fill out on site and give them back to the volunteers who are collecting these comments!

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2622-1 General Support



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SEATTLE WA 980

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OCT 22 2018
Puget Sound
Clean Air Agency

Puget Sound Clean Air Agency, please approve the LNG facility in Tacoma because:

THE PROJECT WILL PROVIDE ECONOMIC BENEFITS IN THE PUGET SOUND REGION

Puget Sound Clean Air Agency
1904 3rd Ave # 105
Seattle, WA 98101

This statement written in support of Puget Sound Energy's Tacoma LNG facility, during PSCAA's draft SEIS comment period.

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98101-331730

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Charles	Anderson		6224 SE Alpine Rd.		Olalla	WA	98359	2340
Trent	Anderson		414 NE Ravenna Blvd.		Seattle	WA	98115	412
Warren	Asp		17804 92nd Ave. E		Puyallup	WA	98409	132
Lindsey	Austin		3436 Magazine St	#342	New Orleans	LA	90115	290
Mohiddin	Awadri		P.O. Box 111502		Tacoma	WA	98411	378
Brody	Baker		3200 Shyleen St.		Gig Harbor	WA	98335	2360
Mark	Ballot				New Orleans	LA	70115	293
Linda	Barber		PO Box 3896		Silverdale	WA	98383	267
Larry	Barstow		PO Box 24148		Federal Way	WA	98093	205
Virginia	Basher		6936 E. I St.		Tacoma	WA	98404	2336
John	Batinovich		503 S 323 PL	#14H				338
Shirley	Battalio		P.O. Box 1081		Milton	WA	98354	2368
Gordon	Baxter		14108 150th Place SE		Renton	WA	98059	
Gordon	Baxter		14108 150th Place SE		Renton	WA	98059	282
Gordon	Baxter		14108 150th Place SE		Renton	WA	98059	283
Jonathan	Beach		19014 61st St. E		Lake Tapps	WA	98391	2366
Andrew	Bellini		PO Box 3162		Federal Way	WA	98063	280
Tommy E.	Belvin		11221 3rd Ave Ct E		Tacoma	WA	98445	246
R.	Benoit		3701 Belvidere Ave. SW		Seattle	WA	98126	2519
Bobbie	Berkowitz		1900 Alaskan Way	Apt 312	Seattle	WA	98101	279
Naomi	Best		20712 7th St. KPS		Lakebay	WA	98349	2356
Jonathan	Bingham		134th		Kent	WA	98042	1916
Simona	Blaga		7624 Maltby Rd.		Woodinville	WA	98072	390
Nathaniel	Block		5601 N. 37th St E		Tacoma	WA	98407	237

First Name	Last Name	Organization	Address1	Address2	City	State	Zip Code	File Number
Brendan	Bohannon		4005 20th Ave W	Suite 115	Seattle	WA	98199	227
Sharon	Bohannon		12101 Bollenbaugh Hill Road		Monroe	WA	98272	256
Jose	Bonita		17910 41st Ave		Seattle	WA	98188	285
Pablo	Borja		2016 7th Street		Bremerton	WA	98337	274
Justin	Bowe		2603 1/2 6th Ave	Apt D	Tacoma	WA	98406	239
Howard	Brenzel		3122 Oas Dr W		University Place	WA	98466	388
Lawson	Bronson		29835 10th Ave SW		Federal Way	WA	98023	234
Larry	Brown		401 2nd Street NE		Auburn	WA	98002	291
Steven	Brown		P.O. Box 126		Ashford	WA	98304	2508
Al	Bruce		15300 SE 344th St		Auburn	WA	98092	382
Patrick	Buckley		2711 SE 32nd Ave.		Portland	OR	97202	437
Tyler	Byrd		114 W. Magnolia St.	Suite 505	Bellingham	WA	98225	138
Rene	Caballero		1902 South Union Ave		Tacoma	WA	98405	273
Mark N.	Cabasag		30304 125th St. SE		Auburn	WA	98092	159
Veronica K.	Cardenai		17931 Fremont Ave. N.		Shoreline	WA	98133	134
Jane	Carten		28 Shorewood Dr.		Bellingham	WA	98225	146
Dan	Cella		5330 Nathan Ave SE		Auburn	WA	98092	240
Adam	Cobun		3218 So. Durango		Tacoma	WA	98409	1941
Dale	Coburn		903 12th Pl. N		Edmonds	WA	98020	145
Rick	Cocker		210 Burke Drive		Camano Island	WA	98282	297
Luke	Coffect		1625 E. 72nd St.	Ste 700 #1	Tacoma	WA	98404	418
Patti	Connolly		18220 Vineway Pl.		Arlington	WA	98723	2520
Donna	Curley		8611 Wildwood Ave. SW		Lakewood	WA	98498	2338
Rowena	Daguio		3501 S 38th St	#130	Tacoma	WA	98409	336
Bob	Dahl		P.O. Box 359		McCleary	WA	98557	2512
Erik	Dahl		2818 206th Terrace NE		Sammamish	WA	98074	312
Steve	Danisher		2000 Alaskan Way		Seattle	WA	98121	310
Adam	Davis		111 C St. SW		Castle Rock	WA	98611	431
Mike	Davis		6811 S. Lawrence		Tacoma	WA	98409	133
Kathleen	Deakins		26331 8th Ave S		Des Moines	WA	98189	202
Gideon	Decker		1025 Austin Street		Bellingham	WA	98225	269
Paul	Diesner		2550 Thorndyke Ave W		Seattle	WA	98199	233
David	Dingler		1847 15th Ave.		Longview	WA	98632	1932
Cameron	Doneen		103 13th Ave. E	Apt. 18	Seattle	WA	98102	395
Steven	Dudley		13811 32nd Ave NW		Gig Harbor	WA	98332	277
Tiffanie	Eagle		615 S Hawthorne St.		Tacoma	WA	98465	2507
Julie	Edmondson		6221 Lakewood Dr. W	#164	University Place	WA	98467	2335
Jeff	Edmund		37707 38th Ave S		Auburn	WA	98001	337
Henry	Elaran		1928 West Union Ave	#102	Tacoma	WA	98405	271
Erl Jan	Encina		11925 Mayfair Ave SW		Port Orchard	WA	98367	375
Rewell	Encina		11925 Mayfair Ave SW		Port Orchard	WA	98367	373

First Name	Last Name	Organization	Address1	Address2	City	State	Zip Code	File Number
Bill	Enger		3277 Appaloosa Way		Bremerton	WA	98310	400
Travis	Englehart		43615 SE 170th St		North Bend	WA	98045	288
James	Ericson		15623 44th Pl. W	Unit A	Lynnwood	WA	98087	1936
Berit	Eriksson		220 W. Olympia	#240	Seattle	WA	98119	226
Jim	Evans		12529 SE 53rd Street		Bellevue	WA	98006	289
Joel	Fahselt		114 East Tawas Lake Road		East Towas	MI		261
Len	Faucher		515 Goostevens Ave SE		Olympia	WA	98501	136
Jason	Favre		3923 49th St. E		Tacoma	WA	98443	2337
Bill	Feldt		601 S 291st St.		Federal Way	WA	98003	2521
Terry	Fenll		1426 11th Ave W		Seattle	WA	98119	383
Gary	Ferko		152		Olympia	WA	98512	2525
Deb	Ferry		18305 NE 9th Place		Bellevue	WA	98007	1919
James	Field		7415 96th Avenue SW		Lakewood	WA	98498	371
Brenda	Filesner		20607 197th Ave E		Orting	WA	98360	244
Seani	Fitzpatrick		616 N 3rd St.	Apt. 6	Tacoma	WA	98403	2354
Tom	Flora		16919 88th Ave E		Puyallup	WA	98375	379
Jackson	Foley		6058 5th Ave NE		Seattle	WA	98915	296
Samuel	Folgerness		3323 N. 28th St		Tacoma	WA	98407	262
Bill	Forslund		9094 Kono Lane NE		Bainbridge Island	WA	98110	318
Jamean	Fort-Johnson		6928 E J St		Tacoma	WA	98404	332
Mitchell	French		810 Autumn Lane		Bellingham	WA	98229	263
Donald	Gaines		4628 Wayneworth St. W		University Place	WA	98466	2527
Terry	Galbreath		15632 SE 264 Place		Covington	WA	98042	414
Todd	Gallagher		1920 Fairview Rd NE		Olympia	WA	98506	259
Basheer	Ghazali		7784 40th St. W	#15	University Place	WA	98466	439
Dana	Giauque		2204 168th St E		Tacoma	WA	98445	331
Patrick	Gillette		4008 36th Ave. W		Seattle	WA	98199	2514
Jana	Gillihan		1013 Scammon Crk. Rd.	Apt. N-3	Centralia	WA	98531	2349
Marc	Gillihan		1013 Scammon Crk. Rd	Apt. N3	Centralia	WA	98531	2362
Ray	Giometti		323 Pelly Ave. N		Renton	WA	98057	2373
Eugene	Goldsmith		5840 Church Rd.		Ferndale	WA	98248	392
Yvonne	Goldsmith		5840 Church Road		Ferndale	WA	98248	393
Dianne	Gordon		70 Big Bear Pl.		Issaquah	WA	98027	153
Shawn	Greinger		15700 159th Ln SE		Yelm	WA	98594	324
Sanjay	Gupta		4707 79th Ave. Ct. W		University Place	WA	98466	419
Rich	Gurtiza		1711 W. Nickerson St.		Seattle	WA	98119	1926
Christina	Hall		1555 S. Fawcett Ave		Tacoma	WA	98402	2252
Melissa	Hanlett		142 N. 75th St.	Apt. 4	Seattle	WA	98103	1913
Andrew	Harris		6827 S Junett St.		Tacoma	WA	98409	2351
Patricia	Hartle				Seattle	WA	98116	381
Rick	Hasselback		2855 29th Ave. West		Seattle	WA	98199	2372

First Name	Last Name	Organization	Address1	Address2	City	State	Zip Code	File Number
Heather	Haugland		2009 I St.		Bellingham	WA	98225	2515
Ross	Henderson				Bellevue	WA	98006	1938
Kate	Hertgering		1508 4th Ave E		Olympia	WA	98506	322
Donald	Hindman		15010 262nd Ave SE		Issaquah	WA	98027	372
Christine	Hoffmann		4509 15th Ave. NE		Lacey	WA	98516	1937
AndrÃ©	Hopkins		6826 S. Oakes St.		Tacoma	WA	98409	2353
Channan	Huff		17336 Old Hwy.		Tenino	WA	98589	2348
Marcus	Hugee		3832 Fawcett Ave		Tacoma	WA	98418	278
Joree	Ianagbak		6726 82nd Street SW		Lakewood	WA	98499	230
Efnen	Isbento		26006 11th Pl. S		Des Moines	WA	98198	131
Jan	Jacobs		2025 First Ave	Suite 900	Seattle	WA	98121	2369
Kate	Jansone		1920 70th Ave W		University Place	WA	98466	377
Rachel	Janssen		3711 164th St. SW	#N 155	Seattle	WA	98087	391
Gerald	Jarman		1324 South I Street		Tacoma	WA	98405	284
Lewis	Johansen		500 NE Sand Lane		Belfair	WA	98528	232
Brenna	Johnson		424 Ramsdell St.		Firecrest	WA	98466	157
Enchenties	Johnson		2132 South Union Ave	Apt. A-22	Tacoma	WA	98405	130
Thomas	Jordan		1441 N. North Lake Way		Seattle	WA		151
Ermalina	K		6726 82nd St		Lakewood	WA	98499	248
Derek	Kane		5615 66 Ave. E		Puyallup	WA	98311	143
Alex	Karre		16625 Redmond Way	#M433	Redmond	WA	98052	294
Samed	Kassem		PO Box 65922		University Place	WA	98464	340
Sandy	Keathley		1260 Gerity Road		Bellingham	WA	98229	129
David Levi	Kelch		2602 S. 38th St. #315		Tacoma	WA	98409	160
Tom	Kenney		411 Arbutus Pl.		Bellingham	WA	98225	137
Rudy	Kerkuliet		12344 Rainier Dr.		Burlington	WA	98233	398
Phil	Kiug		147 Perry Ave. N		Port Orchard	WA	98366	2510
Shelly	Kleppe							2350
Katie	Knifong		17899 40th Ave NE		Seattle	WA	98155	319
Bret	Knutson		15004 262nd Ave. SE		Issaquah	WA	98027	2254
Dan	Koch		27938 NE 26th St.		Redmond	WA	98053	411
Gideon M.	Korley		4111 11th Ave NE	#205	Seattle	WA	98105	272
Michele	Kram		9314 NE 133rd St.		Kirkland	WA	98034	1923
Michaela	Lake				Bellevue	WA	98004	1943
Rud	Lake		5 Plum St.		Aberdeen	WA	98520	2341
David	Landers		10514 NE 197th St.		Bothell	WA	98011	405
Abe	Lardo		4208 Shoshone St W		University Place	WA	98466	231
Joey	Lata		2212 S 288th Place		Federal Way	WA	98003	268
Manny	Lata		216 Stanley Ave		Algona	WA	98001	270
Anna	Lavik		307 W. Dravus St.		Seattle	WA	98119	406
Nathe	Lawver		4215 N Gove St.		Tacoma	WA	98407	2346

First Name	Last Name	Organization	Address1	Address2	City	State	Zip Code	File Number
Shane	Leck		6623 Eastside Drive NE		Tacoma	WA		135
Scott	Leek		5211 Hyada Blvd NE		Tacoma	WA	98422	295
Allison	Leigh		11340 Bartlett Ave. NE		Seattle	WA	98125	396
Amber	Lenscl		2209 Cascada Pl W		University Place	WA	98466	376
Ralph	Leslie		4920 SW 319th Ln.	Apt 203	Federal Way	WA	98023	1930
Frank	Leyritz		644 SW 127th		Seattle	WA	98146	430
Julie	Linville		19209 112th St E		Bonney Lake	WA	98391	330
Terry	Linville		19209 112th St E		Bonney Lake	WA	98391	328
Wyatt	Linville		19209 112th St E		Bonney Lake	WA	98391	323
Larisa	Ljubarskaya		118 NE 55th St.		Seattle	WA	98105	1918
Albina	Lotukoi		33327 28th Pl SW					260
Daniel	Lovely		6700 SE Arcadia Rd		Shelton	WA	98584	341
Elizabeth	Lucas		10911 Crescent Valley Dr. NW		Gig Harbor	WA	98332	2357
Chloe	Luce		22629 4th Ave. SE		Bothell	WA	98021	424
Thomas M.	MacGregor		4015 S. M St.		Tacoma	WA	98418	155
Jill	Mackie		2503 W McGraw		Seattle	WA	98199	1929
Ingra	Maddox		24918 60th Ave E		Graham	WA	98338	235
Kathleen	Maddox		12916 SE 186th Pl.		Renton	WA	98058	434
Noel	Magbitang		16517 A St. S		Spanaway	WA	98387	421
Allan	Makiling		3228 S Union Ave	Apt 316	Tacoma	WA	98409	300
Kristine	Maristela		4521 NE 5th Pl.		Renton	WA	98059	425
Mark	Martinez		5807 A St.		Tacoma	WA	98408	2363
Matt	Mathisen		3804 Mathisen Ln NW		Bremerton	WA	98312	329
Andy	Mayer		1905 C Ave.		Anacortes	WA	98221	429
Sheri	Maynard		Unit 204		Dwall	WA	98019	380
Nouhairi	Mbarek		PO BOX 126748		Seattle	WA	98111	254
Kris	McAferty		4421 89th Ave. SE		Olympia	WA	98501	1942
Patricia	McClements		5001-57 Ave. Ct. W.		University Place	WA	98467	402
Kristina	McClenahan		15203 11th Dr. SE		Mill Creek	WA	98012	2504
Laura	McKinney		8990 Merganser St.		Blaine	WA	98230	147
Jeff	McMeekin		1765 12th Ave NE		Issaquah	WA	98029	154
Damarkus	McNabb		4700 W Village King		Lakewood	WA	98499	229
Tammie	McWell		2220 S. 362nd St.		Federal Way	WA	98003	2518
Andrea	Medgard		6928 E J St		Tacoma	WA	98404	334
Justin	Meinzer		5625 S. M St.		Tacoma	WA	98408	2359
Scott	Milner		19029 90th Pl. NE		Bothell	WA	98011	394
Lamarco	Mitchell		13529 200th St. E		Graham	WA	98335	2523
William	Mogg		2722A Crystal Springs Rd W		University Place, WA		98466	253
Mike	Moore		2200 Alaskan Way	Suite 160	Seattle	WA	98121	320
Mike	Moren		10520 12th Avenue NW		Seattle	WA	98177	258
Rudy	Morrow		3228 South Union Ave		Tacoma	WA	98409	301

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Lynn	Murphy		8241 Union Rd		Sedro Woolley	WA	98284	139
Peter	Murphy		Thea's Landing Apartments	Dock Stree	Tacoma	WA	98402	2367
Harmony	Murray		616 N 3rd St.	Apt. 6	Tacoma	WA	98403	2358
Shelby	Naten		809 108th Pl. SE		Everett	WA	98209	2505
Lin J.	Nelson		526 Fern Rd.		Bellingham	WA	98225	128
William	Ness		11030 Evergreen Way	B317	Everett	WA	98204	315
Nick	Nickolas		PO Box 1241		Gig Harbor	WA	98335	313
Joseph	Nicodemus		8710 Moreland Ave SW		Lakewood	WA	98498	266
Candy	Nigretto		3717 N Frace		Tacoma	WA	98407	286
Carlos	Noriega		300 Queen Anne		Seattle	WA	98109	265
Roger	Olsen		4617 N. Darien Dr.		Tacoma	WA	98407	142
James	Orvis		23529 93rd Ave		Edmonds	WA	98020	311
George	Osborn		2052 Bradley St.		Du Pont	WA	98327	141
Daniel	Ostertag		789 Pine Dr.		Enumclaw	WA	98022	2339
Michael	Ostrenski		5707 Harrison Ave.		Anacortes	WA	98221	417
Jeff	Paraocse		2715 N 29th Street		Tacoma	WA	98407	370
Jeff	Pardee		1826 E 32nd St.		Tacoma	WA	98404	2347
Richard	Pardo		6415 Lombard Dr. NW		Gig Harbor	WA	98335	2522
David	Partikian		3614 A California Ave. SW	#123	Seattle	WA	98116	2509
Andy	Peake		1400 W Washington St.	104-240	Sequim	WA	98382	2517
James	Penhale		923 East 50th St.		Tacoma	WA	98404	2342
Matthew	Perry		3130 S 38th St		Tacoma	WA	98409	339
Andrea	Peterson		4402 N. 43rd St		Tacoma	WA	98407	228
M.V.	Peterson		4623 SW Frontenac		Seattle	WA	98136	2371
Bryan	Petri		15431 Broadway Ave.		Snohomish	WA	98296	426
Jesper	Pfeil		3850 Sweet Rd.		Blaine	WA	98230	2513
Kiera	Phifer		7221 S Mason Ave		Tacoma	WA	98409	317
Chris	Philips		18030 53rd Ave. NE		Lake Forest Park	WA	98155	2370
Judy	Philips		18030 53rd Ave. NE		Lake Forest Park	WA	98155	2374
Peter	Philips		19679 Marine view Dr. SW		Normandy Park	WA	98166	2375
Ralph	Potts		16108 36th Ave. W	#130	Lynnwood	WA	98087	427
Michelle	Powell		712 22nd St NW		Puyallup	WA	98371	327
Lorraine	Price		4318 Prestwick Ln. SE		Olympia	WA	98501	416
Patricia	Purcell-Denny		16011 86th St. E		Sumner	WA	98392	2255
Muammer	Qusiem		PO Box 654222		University Place	WA	98466	255
Len	Radziwanowicz		9406 25th Ave. NE		Seattle	WA	98115	1928
Jayson	Ray		17520 46th St KPS		Long Branch	WA	98351	247
Kay	Remillard		4703 Christensen Muck Rd. E		Eatonville	WA	98328	1935
Darren	Rhinehardt		923 E 50th St.	East Side	Tacoma	WA	98404	2345
Shane	Richards		7510 31st Ave. NW		Seattle	WA	98117	428
David	Riddle		1160 Thorne Rd.		Tacoma	WA	98421	2343

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Adam	Riley		5516 7th Ave NW		Seattle	WA	98107	342
Deenie	Robertson		15843 NE 164th St.		Woodinville	WA	98072	2376
Soni	Ronak		2702 SW 349th Pl.		Federal Way	WA	98023	2361
Marv	Roosendaal		211 Hoh St. SE	#326	Lacey	WA	98516	433
Jo	Rowe		1612 Bethel St. NE		Olympia	WA	98506	415
Carlyn	Roy		2915 N 30th St		Tacoma	WA	98407	321
Michael	Rushton		4015 224th St E		Spanaway	WA	98387	201
Ken	Saunderson		9201 6th Ave. NW		Seattle	WA	98117	436
Kyle	Savage				Orting	WA	98360	387
Mata	Scanlan		1415 S 302nd St		Federal Way	WA	98003	333
Sarah	Scherer		5831 S Leo St		Seattle	WA	98178	314
Joel	Schlepp		8916 NE 191st Place		Bothell	WA	98011	397
Mick	Schultz		5503 138th St. Ct. NW		Gig Harbor	WA	98332	156
Ryan	Scott		251 Rio Vista Lane		Naches	WA	98937	236
Chad	See		7511 Greenwood Ave. N	#803	Seattle	WA	98103	2377
Christopher	Serrano		2706 S. 12th St		Tacoma	WA	98405	298
Adel	Shaibi		81 Willmae Rd.		Rochester	NY	14616	1931
Carry	Shanley		3228 South Union Ave		Tacoma	WA	98409	275
Joesef	Sharbi		812 Columbia Ave		Fircrest	WA	98466	249
Nasr	Sharif		7205 22nd St W		University Place	WA	98466	252
Gurvinder	Singh		6116 24th Ave. NE		Seattle	WA	98115	1927
Delba	Singleton-Leslie		4527 S. 256 Pl.		Kent	WA	98032	1922
Dennis	Skretta		10733 2nd Ave. NW		Seattle	WA	98177	420
Nathan	Smith		18226 36th Ave W	Apt F-1	Lynnwood	WA	98037	389
Sam	Smith		18226 36th Ave. W	#F-1	Lynnwood	WA	98037	409
Timothy	Smith		16409 NE 82nd St.		Vancouver	WA	98682	401
Wilma Joy	Smith		8388 Hickory Street NE		Bremerton	WA	98331	264
Dale	Spencer		2005 Diamond St. SE		Lacey	WA	98503	144
Serene	Stambaugh		16724 NE 89th St.		Redmond	WA	98082	1920
Chris	Stapleton		5720 122nd Ave. SE		Bellevue	WA	98006	2506
Curtis E.	Stoner		1018 N. 7th St.		Tacoma	WA	98403	158
L.	Strom		17013 NE. 18th St.		Bellevue	WA	98008	1914
LBJ	Tanoa		8522 35th St W		University Place	WA	98466	245
Kevin	Tedrick		1555 South Fawcett Ave.		Tacoma	WA	98402	2256
Dee	Tezelli		2000 Alaskan Way		Seattle	WA	98101	316
Doug	Thomas		2950 Newmarket St.		Bellingham	WA	98226	149
Jake	Tierney		2305 SE Hawthorne Blvd	Apt B	Portland	OR	97214	325
Marianna	Tongedale		2202 Cascade Pl W		University Place	WA	98466	374
Jaymes	Toycen		26020 201st PL SE		Covington	WA	98042	204
Everett	Trout		5409 143rd Ave SE		Bellevue	WA	98109	257
Josh	Turrell		2211 Rimland Dr. Ste 422		Bellingham	WA	98226	

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Josh	Turrell		2211 Rimland Dr. Ste 422		Bellingham	WA	98226	
Josh	Turrell		2211 Rimland Dr. Ste 422		Bellingham	WA	98226	127
Herald	Ugles		PO Box 487		Lakebay	WA	98349	292
Michelle	Vargo		11110 NE 48th Place		Kirkland	WA	98033	1917
Patricia	Vargo		14057 NE 181st Street	Apt. E204	Woodinville	WA	98072	1915
Joe	Vincenzo		3411 S. Union Ave		Tacoma	WA	98409	243
Frank	Voorhees		13730 NE 15th Ave.	#A 204	Seattle	WA	98125	408
Jennifer	Voorhees		18226 36th Ave. W	#F1	Lynnwood	WA	98037	407
Summer	Walker		2525 Sheridan Ave		Tacoma	WA	98405	326
Debra	Walker-Goedhard		902 7th Ave. S.		Edmonds	WA	98020	399
Mel	Walters		437 167th Ave.		Bellevue	WA	98008	1924
Tom	Walvath Jr.		224 Marine View Dr.		Tacoma	WA	98402	2355
Janice	Warren		17140 Sealawn Dr.		Edmonds	WA	98026	423
Paul	Watson		19211 143rd St E		Bonney Lake	WA	98391	251
Michael	Wees		3020 17th Street		Bremerton	WA	98312	287
Chris	Welch		1710 12th Ave NW		Puyallup	WA	98371	140
Kathy	Welch		7811 Burgess St. W		Lakewood	WA	98499	2365
Mark	Wells		3212 17th St. SW		Puyallup	WA	98373	1940
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2623-1 General Opposition

Dear Puget Sound Clean Air Agency,

Puget Sound Energy's proposed LNG facility flies in the face of the Air Agency's responsibility to protect public health & to reduce our region's contribution to climate change. Please produce an accurate environmental review that reflects the hazards of fracked gas and methane on our air & climate.

[redacted]

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☑ **YES! I will attend the hearing.**

☐ **I can't attend, but keep me informed.** I want to join Sierra Club's mobile action network!

☐ **YES! I want to volunteer**

Puget Sound Clean Air Agency
C/O Sierra Club
180 Nickerson Street, Suite 202
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Dear Puget Sound Clean Air Agency,

Puget Sound Energy is willing to sacrifice community health and safety, ratepayer money, and Puyallup Tribal land for a liquefied natural gas (LNG) facility that we do not need.

Two thirds of "natural" gas is fracked, and fracking is a dirty and environmentally hazardous extraction process that emits a pollutant called methane. When properly accounting for methane leaks, fracked gas has climate impacts that rival those of coal.

The analysis of life cycle emissions associated with natural gas must assume a 3 percent overall leakage rate of methane from the time gas is fracked to when it reaches its destination. The climate-disrupting impact of methane must be calculated at 87 times greater than that of carbon dioxide.

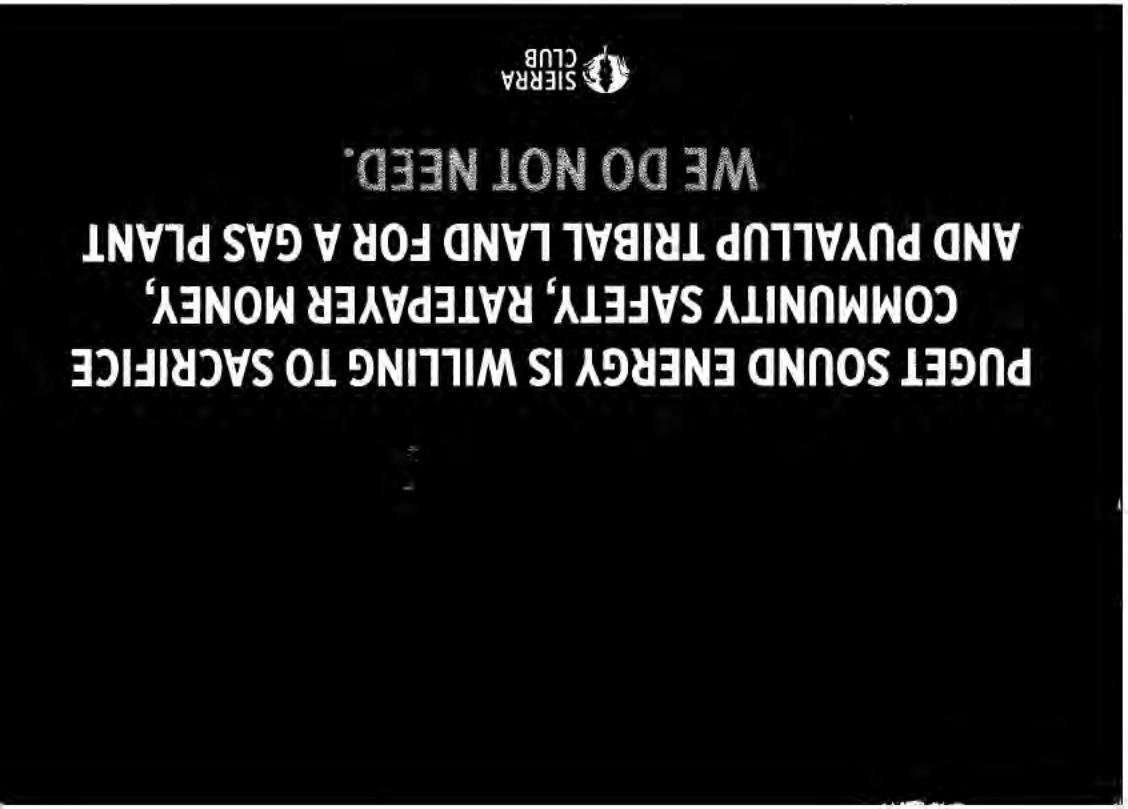
Please produce an accurate environmental review that reflects the true hazards fracked gas has on our air and climate.

Sincerely,

[redacted]

PLACE STAMP HERE

Puget Sound Clean Air Agency
C/O Sierra Club
180 Nickerson Street, Suite 202
Seattle, WA 98109



2624

2624-1 General Opposition
2624-2 Outside of SEIS Scope
2624-3 LCA Inputs and Assumptions - Leakage/Slippage
2624-4 LCA Inputs and Assumptions - Global Warming Potential Value

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2625-1 Regulatory Framework
2625-2 LCA Calculations
2625-3 General Opposition
2625-4 SEPA Alternatives

As a supporter of the Puyallup Tribe, there is **nothing more important than safeguarding Treaty-protected homelands.** Our homelands are in jeopardy if Puget Sound Energy's Liquified Natural Gas plant is allowed to operate.

We urge the PSCAA to withhold permits and redo the SEIS because:

- PSCAA has authority and obligation to consult with the Tribe and has failed to formally do so.
- This draft SEIS analysis is incomplete. This lack of complete information makes this analysis unacceptable.
- The SEIS fails to use the best available science for estimating global warming impacts. Using the best available science to analyze global warming impacts will show that the LNG plant will be harmful to our community.
- The no action alternative will actually keep our families safer and protect our Treaty-protected homelands and natural resources.

On behalf of all Tribal members and the citizens of Tacoma, **we urge PSCAA to redo the SEIS.**

Please respond to my concerns.

Name
Email
Address

[redacted]

1904 Third Ave, Suite 105
Seattle, WA 98101

Puget Sound Clean Air Agency
ATTN: Public Comment on DSEIS,
PSE LNG Project

RECEIVED
NOV 21 2018
Puget Sound Clean Air Agency

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2532-1 LCA Inputs and Assumptions - Global Warming Potential Value
2532-2 LCA Inputs and Assumptions - Natural Gas Source
2532-3 SEPA Alternatives
2532-4 SEPA Alternatives
2532-5 Regulatory Framework

From: [redacted]
To: Public Comment
Subject: Tacoma LNG SEIS Project Comment
Date: Wednesday, November 21, 2018 8:24:39 PM

Dear Responsible Official,

Puget Sound Energy and Tote Marine seem to imagine that a clean energy future can be arrived at by digging the fossil fuel hole deeper This proposed LNG project is another step toward climate chaos at a moment when the IPCC has given us a clear warning that we must urgently move away from fossil fuels

Fracked gas is not a lesser evil Scientists' understanding of methane's impact on the climate continues to evolve, and at every step along the way we learn that fracking allows more methane escapement than we had previously observed and that the impact of methane on the climate, particularly in the short term, is even more serious than had been previously understood

I applaud your decision to analyze the lifecycle of the greenhouse impacts of this project and to conduct this more rigorous analysis Thank you

I urge you to revise the analysis to account for the following:

1 Methane should be counted as 86 times more potent than CO2 based on the current IPCC analysis (AR5 rather than AR4) considering a 20 year timeframe (rather than the 100-year)

2 Revise the analysis of the impacts of fracking in British Columbia based on recent research(1) demonstrating that methane escapement has been dramatically under-estimated

3 Revise the "no-action alternative" to include a clean energy alternative in which PSE provides electricity not with a different source of fracked gas, but with renewable energy and energy efficiency

4 Revise the "no-action alternative" to include the assumption that Tote Marine will achieve a 50% GHG reduction, in line with the International Maritime Agency's established goals This reduction might alternatively be achieved by a combination of fuel efficiency, slow steaming, propulsion improvements, biofuels, battery electric propulsion or many other alternatives besides fracked LNG (2) For clean local emissions requirements, Tote Marine can achieve virtually all of the localized lower-particulate and lower SOx and NOx benefits claimed for LNG propulsion by opting for low-sulfur marine gas oil over heavy fuel oil, and installing selective catalytic reducers and diesel particulate filters (3)

5 This more accurate analysis will show that the project has a significant and unmitigated impact on the global climate, which
should be seen as a sufficient basis for denial of the Notice of Construction application

Thank you for your time and consideration of these comments

Footnotes:
(1) Emmaline Atherton et alia, 'Mobile measurement of methane emissions from natural gas developments in northeastern British Columbia, Canada,' Atmospheric Chemistry and Physics, 17, 12405–12420, 2017
(2) https://www researchgate net/figure/CO-2-emission-reduction-potential-from-individual-measures-classified-in-5-main_fig2_315837106
(3) https://en nabu de/imperia/md/content/nabude/verkehr/140702-nabu-backgroundpaper_containerships pdf

Sincerely,
[redacted]

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From: [redacted]
To: Public Comment
Subject: Puget Sound Energy LNG Project
Date: Wednesday, November 21, 2018 11:11:25 PM

Puget Sound Clean Air Agency,

Dear Puget Sound Clean Air Agency,

First of all, I want to thank you for opening up this review process on the Puget Sound Energy Liquefied Natural Gas project being built in Tacoma. With our climate in grave peril, as emphatically stated in the latest IPCC report, your review of the greenhouse gas impacts of the natural gas used in this project couldn't be more important. Those scientists make clear that we cannot, and must not, allow any further fossil fuel infrastructure to be built and must rapidly transition to renewable energy sources.

My first concern with this draft SEIS is that it's not complete. There are several sections that are missing data and so we can not accurately assess the quality of the report and understand how certain conclusions are reached. Because of that, I request that you complete this report, reissue it, and then reset the public comment period so that we have time to review the completed report thoroughly.

With that said, I am aware of several issues with the current draft report you issued on October 8th. It is my belief that if these issues are given proper attention and addressed with best available science, it will show that the marginal improvements in emissions the study claims will disappear and the project will in fact be worse for the climate than doing nothing at all.

Here are some of the issues as I understand them:

- The SEIS is not using the best available science for the Global Warming Potential (GWP) of methane. It uses the 100-year GWP of methane and not the 20-year value which is much more relevant given the urgency in addressing the climate crisis. The appropriate 20-year GWP value to use is 96.
- This facility is projected to have a 40 year lifespan, so why does the report project out to 100 years, which is 90 years beyond the time we need to have taken decisive action?
- The SEIS claims emissions benefits from customers that Puget Sound Energy simply does not have. According to PSE and the City of Tacoma, the only maritime customer is TOTE with its two vessels which have already delayed their conversion to consume LNG. Securing new customers (there are only just over 100 LNG ships in operation out of a worldwide fleet of 90,000) as well as the additional permitting could take years and is not guaranteed.
- The SEIS says that emissions will only be reduced if the natural gas comes from Canada, because leakage rates are reportedly lower there than in the US. Shockingly, most leakage rates were self-reported by the fossil fuel industry based on models and recent measurements taken in the field have shown that leakage rates are much much worse.
- How can it be guaranteed that PSE is sourcing its gas from BC anyway? Their recent filings

2533-1 LCA Calculations
2533-2 LCA Inputs and Assumptions - Global Warming Potential Value
2533-3 LCA Inputs and Assumptions - Global Warming Potential Value
2533-4 Purpose and Need
2533-5 LCA Inputs and Assumptions - Natural Gas Source

2533-6 LCA Inputs and Assumptions - Natural Gas Source
2533-7 LCA Inputs and Assumptions - Leakage/Slippage

show they relied on gas from BC, A berta, and the US. And with the recent pipeline explosion in BC that interrupted PSE's supply, we know it's not always available.
- When ships use any fuel, a certain percentage of it escapes without combusting through the exhaust system and into the atmosphere. This is known as slippage and the SEIS uses a lower rate than is considered best practice.

Thanks again for initiating this crucially important review of this facility and I hope that you will take best available science into consideration when revising this draft SEIS.

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2534-1 LCA Inputs and Assumptions - Global Warming Potential Value
2534-2 LCA Inputs and Assumptions - Natural Gas Source
2534-3 SEPA Alternatives
2534-4 Determination of SEIS Scope - Comparison to FEIS
2534-5 LCA Calculations
2534-6 Regulatory Framework

From: [redacted]
To: Public Comment
Subject: Comment on Tacoma LNG SEIS
Date: Friday, October 26, 2018 5:56:54 PM

Dear Puget Sound Clean Air Agency,

As a person of faith, I believe we are called to care for both creation and communities My values of stewardship, justice, and responsibility have compelled me to comment on this project
Thank you for conducting a supplemental environmental review of the greenhouse gas emissions for PSE's proposed LNG facility on the Tacoma Tideflats

As a member of Earth Ministry, which has been working closely with scientists and policy experts to review the SEIS, I am concerned that the document does not fully analyze the climate impacts of this project

Please address the following in the Tacoma LNG SEIS:

1 Methane's impact on climate – The SEIS uses a dated value for the 100-year Global Warming Potential (GWP) for methane from 2007 when updated values were published 2013 and then again in 2016 Using the best available science shows the plant would have higher greenhouse gas emissions Additionally, given the short timeframe required to address climate change as recently noted by the United Nations, the SEIS should use the 20-year GWP for methane, which shows that the plant will be more than 50% dirtier over the next two decades

2 Source of fracked gas – It is a false assumption that British Columbia would be the only gas source for this facility and this requirement is not enforceable In addition, the SEIS relies upon self-reported pollution data on BC gas from the fossil fuel industry It also failed to incorporate multiple, recent independent studies showing methane pollution rates as much higher than those reported by the fossil fuel industry

3 Lack of alternative options – TOTE is already using ultra-low sulfur diesel (ULSD) and other companies are also using ULSD or scrubbers to meet emission requirements The no action alternative assumes that LNG is required for TOTE to meet its emission requirement, when these alternatives already exist and are in use

4 Alterations to the original proposal – Deviating from PSE's proposal, the SEIS included bunkering more than the two TOTE vessels on the Blair Waterway The SEIS should instead provide an analysis using only secured customers

5 Incomplete information – Use of placeholder values, incorrect units of measurement, and the stated need for more data from PSE makes the analysis incomplete and hard to follow The draft SEIS should be thoroughly edited and released for a new full public comment period

The Puyallup Tribe, citizens of Tacoma, and residents of the Salish Sea have a right to know the total local and global impacts of this proposal With missing data and alterations to the project, this draft SEIS does not account for full climate impacts

I ask that the PSCAA live into its self-proclaimed commitment to be good and wise stewards of our shared resources Please re-start this review with complete information and additional opportunity for comment

Thank you for caring for creation and our community

Sincerely,
[redacted]

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