

Exhibit G

**UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY**

In the Matter of:

**U.S. DOE Economic Consulting Studies)
“Macroeconomic Impacts of LNG)
Export Studies”)
2014 and 2015)
_____)**

FR Doc No: 2015-32590

Electronic Filing of Comments Using Online Form at: <http://www.energy.gov/fe/2015-lngstudy>

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February 12, 2016

U.S. Department of Energy (FE-34)
Office of Regulation and International Engagement
Office of Fossil Energy
P.O. Box 44375
Washington, DC 20026-4375

Re: LNG Export Economic Consulting Studies

Dear Mr. Robert Smith / Mr. Edward Myers:

On December 29, 2015, the Office of Fossil Energy at the U.S. Department of Energy (DOE) posted in the Federal Register a Notice of Availability of a of the 2014 EIA LNG Export Study and the 2015 LNG Export Study, and request for comments.

In order to keep from repeating ourselves over and over again with respect to the same issues, please review our prior comments already on file:

- CALNG / McCaffree 1-24-2013 Initial Comments on NERA study:
http://www.fossil.energy.gov/programs/gasregulation/authorizations/export_study/jody_mccaffree_lam01_24_13_Final.pdf
- CALNG / McCaffree 2-25-2013 Rebuttal Comments on NERA study:
http://www.fossil.energy.gov/programs/gasregulation/authorizations/export_study/reply_comments/Citizens_Against_LNG02_26_13.pdf
and

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http://www.fossil.energy.gov/programs/gasregulation/authorizations/export_study/reply_comments/Citizens_Against_LNG02_26_13.pdf

- CALNG/McCaffree July 21, 2014 comments on Proposed Procedures for Liquefied Natural Gas Export Decisions. Environmental Review Documents concerning Exports of Natural Gas from the United States. LifeCycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States.
(*Could no longer find a weblink to these comments.*)

Due to multiple permit processes that are currently underway on the Jordan Cove LNG Export project we have been limited on our available review time for these U.S. DOE studies. From our review of the October 29, 2015 DOE report titled, “*The Macroeconomic Impact of Increasing U.S. LNG Exports*” we determined the following:

1. The DOE Study did not consider all the negative impacts of increased pollution and greenhouse gas emissions resulting from increased LNG Exports.

CLIMATE IMPACTS

On December 12, 2015, 195 Nations, including the United States, approved a global warming pact at the COP21 Climate Conference in Paris in which among other things the Nations agreed: (*See Exhibit 1*)

- To limit global warming to "well below" 2C, aiming for 1.5C. (COP21 Article 2)
- To aim for Greenhouse gas emissions to peak "as soon as possible," followed by rapid reduction. (COP21 Article 4)
- To strive to formulate and communicate long-term low greenhouse gas emission development strategies.
- To promote universal access to sustainable energy in developing countries through the enhanced deployment of renewable energy.
- To have developed countries provide USD 100 billion per year, from 2020 to help developing nations.

The COP21 Agreement recognizes *that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions.*

Previously on May 18, 2015, Oregon Governor Brown along with a group of 12 sub-national governments collectively representing more than \$4.5 trillion in GDP and 100 million people signed a *Memorandum of Understanding on Subnational Global Climate Leadership*¹ (Under 2

¹ *Global Climate Leadership Memorandum Of Understanding* (MOU) May 19, 2015
https://www.gov.ca.gov/docs/Under_2_MOU.pdf

MOU) (*See Exhibit 2*) that commits them to take leadership on climate action at their level of jurisdiction. Each signatory committed to limit emissions to below eighty to ninety-five percent below 1990 levels, or below two metric tons per capita, by 2050 – which is a level of emission reductions believed to be necessary to limit global warming to less than 2°C by the end of this century.²

On October 28, 2013, former Oregon Governor John Kitzhaber along with Governor Edmund G. Brown Jr. of California, Governor Jay Inslee of Washington and Premier Christy Clark of British Columbia, signed a *Pacific Coast Action Plan on Climate*³ (*See Exhibit 3*) in order to jointly attack climate change by reducing greenhouse-gas emissions.

INCREASING LNG EXPORTS WOULD INCREASE GREENHOUSE GASES

The main component of LNG is methane. Methane is a potent greenhouse gas that can come from many sources, both natural and manmade. The largest source of industrial emissions is the oil and gas industry. While methane doesn't linger as long in the atmosphere as carbon dioxide, it is initially far more devastating to the climate because of how effectively it absorbs heat. In the first two decades after its release, methane is 84 times more potent than carbon dioxide. *Both* types of emissions must be addressed if we want to effectively reduce the impact of climate change. The oil and gas industry loses enough methane every year through leaks and intentional venting and flaring to meet the heating and cooking needs of over 5 million homes. The EPA is now attempting to finalizing national standards that would, for the first time, directly regulate methane emissions. These standards target the oil and gas industry, the top industrial emitter of methane.

Exporting hydraulic fracked gas coming from shale formations is a very polluting process that leaks methane into the atmosphere which **INCREASES LIFECYCLE GREENHOUSE GAS (GHG) EMISSIONS**. A 2007 Carnegie Mellon University study "*Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation*"⁴ found that upstream Green House Gas emissions of Natural Gas and LNG have a higher impact in the total life cycle emissions than upstream coal emissions. This is a significant point when considering a carbon-constrained future in which combustion emissions are reduced.

In February 2014 an article that appeared in Politico written by Bill McKibben and Mike Tidwell stated the following:

*...The industry bombards the public with ads saying natural gas is 50 percent cleaner than coal. **But the claim is totally false. Gas is cleaner only at the point of combustion. If***

² <http://newsroom.unfccc.int/unfccc-newsroom/under-2-mou-a-subnational-global-climate-leadership/>

³ "*Pacific Coast Action Plan on Climate and Energy*" - Signed at San Francisco, California, on the occasion of the Fourth Annual Leaders Forum of the Pacific Coast Collaborative, October 28th 2013

<http://blogs.seattletimes.com/politicsnorthwest/files/2013/10/PCC-climate-and-energ-agreement.pdf>

⁴ "*Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation*" - Paulina Jaramillo; W. Michael Griffin; and H. Scott Matthews – Civil and Environmental Engineering Department, Tepper School of Business, and Department of Engineering and Public Policy, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, Pennsylvania 15213-3890 – July 25, 2007

http://www.ce.cmu.edu/~gdrg/readings/2007/09/13/Jaramillo_ComparativeLCACoalNG.pdf

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you calculate the greenhouse gas pollution emitted at every stage of the production process—drilling, piping, compression—it’s essentially just coal by another name. Indeed, the methane (the key ingredient in natural gas) that constantly and inevitably leaks from wells and pipelines is **84 times more powerful at trapping heat in the atmosphere than CO2 over a 20-year period**, according to the Intergovernmental Panel on Climate Change...

...When you add it all up, using numbers from the EPA, the International Energy Agency and the U.S. gas industry itself, **the final climate impact of fracked-and-liquified-and-exported Appalachian gas is basically as bad as burning coal in Asia.** And that’s using really conservative pollution estimates. More realistic projections (i.e. assuming India’s pipeline leakage rate is higher than the United States’) **would make our gas worse than coal. Worse!** And Europe’s not much better. If we shipped our gas to France, for example, where the leakage rate of gas pipelines is confirmed at 3 percent, **then our gas would—from day one—be worse than if the French just burned coal.**

Why in the world, then, would we frack our mountains, lay disruptive pipelines across America, build gigantic, spewing liquefaction plants like Cove Point [or Jordan Cove] and inflict economic pain on U.S. consumers, farmers, and manufacturers—all for something tantamount to coal? The plan is radical and absurd on its face, benefits no one in the long run but the super-rich fossil-fuel industry and does real harm to an already ailing global climate....⁵ [Emphasis added]

ENVIRONMENTAL AND ECONOMIC COSTS OF AIR POLLUTANTS

On the 26th of September 2012 – the most comprehensive assessment ever of the current global impact of climate change was released by DARA.⁶ (See Exhibits 4-6) 20 governments commissioned the independent report, the first of its kind to show that tackling the global climate crisis **would reap significant economic benefits for world, major economies and poor nations alike.** The DARA press release states:

“Climate Vulnerability Monitor” study’s findings point to unprecedented harm to human society and current economic development that will increasingly hold back growth, on

⁵ A Big Fracking Lie - President Obama isn’t just not fixing climate change—he’s making it worse - January 21, 2014 - By BILL MCKIBBEN and MIKE TIDWELL
http://www.politico.com/magazine/story/2014/01/fracking-natural-gas-exports-climate-change-102452.html?ml=lb_9

⁶ *Ignore climate change and 100m people will die by 2030, shocking new report claims*”By DAILY MAIL REPORTER, **PUBLISHED:** 26 September 2012 <http://www.dailymail.co.uk/sciencetech/article-2208953/Shock-report-claims-100m-people-die-economic-growth-drop-3-2-2030-climate-change-ignored.html>

Dara Press Release:

http://daraint.org/wp-content/uploads/2012/09/CVM_RELEASE_FINAL_ENGLISH.pdf

Dara Report Published - September 26, 2012:

<http://www.daraint.org/wp-content/uploads/2012/09/EXECUTIVE-AND-TECHNICAL-SUMMARY.pdf>

2nd Edition - Climate Vulnerability Monitor - A guide to the cold calculus of a Hot Planet - Executive Summary

the basis of an important updating and revision of previous estimates of losses linked to climate change. (Emphasis added)

The “*Climate Vulnerability Monitor*” Executive Summary states:

This report estimates that climate change causes 400,000 deaths on average each year today, mainly due to hunger and communicable diseases that affect above all children in developing countries. Our present carbon-intensive energy system and related activities cause an estimated 4.5 million deaths each year linked to air pollution, hazardous occupations and cancer.

Climate change caused economic losses estimated close to 1% of global GDP for the year 2010, or 700 billion dollars (2010 PPP). The carbon-intensive economy cost the world another 0.7% of GDP in that year, independent of any climate change losses. Together, carbon economy-and climate change related losses amounted to over 1.2 trillion dollars in 2010.

The world is already committed to the substantial increase in global temperatures - at least another 0.5% C (1°F) due to a combination of the inertia of the world’s oceans, the slow response of the carbon cycle to reduced CO2 emission and limitations on how fast emissions can actually be reduced. The world economy therefore faces an increase in pressures that are estimated to lead to more than a doubling in the costs of climate change by 2030 to an estimated 2.5% of global GDP. Carbon economy costs also increase over this same period so that global GDP in 2030 is estimated to be well over 3% lower than it would have been in the absence of climate change and harmful carbon-intensive energy practices.

Continuing today’s patterns of carbon-intensive energy use is estimated, together with climate change, to cause 6 million deaths per year by 2030, close to 700,000 of which would be due to climate change. This implies that a combined climate-carbon crisis is estimated to claim 100 million lives between now and the end of the next decade...
(Emphasis added)

Report Panel member, DARA Trustee and Former President of Costa Rica, José María Figueres stated in the DARA press release:

“1.3 billion people are still fighting their way out of the most extreme forms of poverty while major economies are today fighting their way out of crippling financial and economic crises. We simply cannot afford to part with more growth. The prospect of economic losses that rise with every decade could destabilize the world economy far before the worst impacts of climate change set in. Governments and international policy makers must act decisively to combat the spiraling costs to national and global GDP resulting from inaction on climate change. The Monitor shows how failure to do so has already caused unprecedented damage to the world economy and threatens human life across the globe. With the investment required to solve climate change already far below

the estimated costs of inaction, no doubt remains as to the path worth taking.”⁷
(Emphasis added)

AIR POLLUTION IMPACTS FROM HYDRAULIC FRACTURING OF SHALE BEDS

The DOE study did not consider the impacts or costs of hydraulic fracturing which could entail environmental, economic and health related problems and issues.

These issues were brought to the DOE’s attention in detail in our August 6, 2012, letter to the DOE. (*Attached as Exhibit 7*) Issues surrounding LNG Exports including Hydrofracking are covered in detail in the two following attached reports:

- Exhibit 8: “*OIL AND GAS Information on Shale Resources, Development, and Environmental and Public Health Risks*”; By U.S. Government Accountability Office, September 2012
- Exhibit 9: “*LOOK BEFORE THE LNG LEAP - Why Policymakers and the Public Need Fair Disclosure Before Exports of Fracked Gas Start*”; By Craig Segall, Staff Attorney, Sierra Club Environmental Law Program.

While the gas industry looks to reap huge profits, local communities will be left to deal with the consequences such as poisoned drinking water, devastated coasts, and extreme air pollution. Both the liquefaction and fracking process will contribute to an increase in greenhouse gas emissions, thus contributing to climate-disrupting global warming pollution and more violent weather and storms. In addition, the massive super-cooling process needed to create the liquefied natural gas for export uses an incredible amount of energy. That is energy that could have been used here domestically. **Why is it assumed by the DOE and the NERA study that we will have an infinite amount of fossil fuel energy in the future?**

The following articles noted below have also been included as exhibits since they address many significant issues with regard to the viability of LNG Export and hydrofracking:

- Exhibit 10: “*Gas Bubble Leaking, About to Burst*” by Richard Heinberg, originally published by Post Carbon Institute | Oct 22, 2012
- Exhibit 11: The New York Times “*Exports of American Natural Gas May Fall Short of High Hopes*” January 4, 2013

Many Countries, States, Regions and Cities have already imposed an outright ban on the hydraulic fracturing process due to pollution impacts. See - <http://keptapwatersafe.org/global-bans-on-fracking/>

A special report that was recently released in October 2013 titled, “*Fracking by the Numbers – Key Impacts of Dirty Drilling at the State and National Level,*” (*See Exhibit 12*) explains in

⁷ Dara Press Release:

http://daraint.org/wp-content/uploads/2012/09/CVM_RELEASE_FINAL_ENGLISH.pdf

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detail the environmental, public health and safety implications of hydraulic fracturing of shale beds.⁸ The Reports Executive Summary States:

Air pollution: Fracking-related activities release thousands of tons of health-threatening air pollution.

- *Nationally, fracking released 450,000 tons of pollutants into the air that can have immediate health impacts.*
- *Air pollution from fracking contributes to the formation of ozone “smog,” which reduces lung function among healthy people, triggers asthma attacks, and has been linked to increases in school absences, hospital visits and premature death. Other air pollutants from fracking and the fossil-fuel-fired machinery used in fracking have been linked to cancer and other serious health effects.*

Global warming pollution: Fracking produces significant volumes of global warming pollution.

- *Methane, which is a global warming pollutant 25 times more powerful than carbon dioxide, is released at multiple steps during fracking, including during hydraulic fracturing and well completion, and in the processing and transport of gas to end users.*
- *Global warming emissions from completion of fracking wells since 2005 total an estimated 100 million metric tons of carbon dioxide equivalent.*

A study that was published by Cornell University on April 12, 2011, entitled “*Methane and the greenhouse-gas footprint of natural gas from shale formations*”⁹ found that:

- *Between 3.6-7.9% of the methane escapes into the atmosphere during shale-gas production due to venting and well leaks; this level is at least 30% higher than that released during conventional natural gas production.*
- *On a 20-year time horizon, the GHG footprint for shale gas is up to 43% higher than conventional natural gas, 50% greater than oil and 20% higher than coal for the same amount of energy produced by each of those other sources.*

LOCAL GREENHOUSE GAS IMPACTS

Increasing greenhouse gases contributes to planet warming, increased droughts and ocean acidification. Droughts have already negatively impacted our States and our food production.¹⁰ **Ocean Acidification and rising acidity has already cost the Oregon and**

⁸ “*Fracking by the Numbers – Key Impacts of Dirty Drilling at the State and National Level*” by Elisabeth Ridlington – Frontier Group and John Rumpler – Environment America Research & Policy Center; Environment America; Oct 2013;

http://www.environmentamerica.org/sites/environment/files/reports/EA_FrackingNumbers_scrn.pdf

⁹ “*Methane and the greenhouse-gas footprint of natural gas from shale formations*”

A letter – Robert W. Howarth, Renee Santoro and Anthony Ingraffea – Published April 12,

2011 <http://journalistsresource.org/studies/environment/energy/natural-gas-hydrofracking-greenhouse/>

¹⁰ • “*Drought prompts cuts to farm irrigation in California, Oregon*” Portland, Ore. | By Courtney Sherwood <http://www.reuters.com/article/2015/05/15/us-usa-drought-farming-idUSKBN0002BL20150515>

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Washington shellfish industries \$110 million, and endangered some 3,200 jobs.¹¹ Those figures are likely to get worse in the coming decades. Particulate pollutants from the life cycle impact of LNG Export projects such as the Jordan Cove LNG Export project would increase respiratory and immune health problems in the local community. Children and elders are especially at risk.¹²

This would directly conflict with Oregon's Renewable Portfolio Standards passed by the Oregon legislature in 2007 and the *COP21 Climate Conference in Paris agreement* signed by President Obama; the *Memorandum of Understanding on Subnational Global Climate Leadership* signed by Oregon Governor Brown; and the *Pacific Coast Action Plan on Climate and Energy* signed by former Oregon Governor John Kitzhaber

On November 18, 2014, the Oregonian stated the following in an article by Ted Sickinger titled, "*Jordan Cove LNG in Coos Bay could quickly become one of the largest greenhouse gas emitters in Oregon,*"¹³

A proposed liquefied natural gas terminal in Coos Bay could quickly become one of the largest, if not the largest emitter, of greenhouse gases in Oregon, federal data shows.

Jordan Cove Energy Project is seeking state permission to release 2.1 million metric tons of carbon dioxide and equivalents annually, equal to 3 percent of the state's greenhouse emissions during 2013....

...Carbon emissions from a competing LNG export proposal in Warrenton could be comparable.

Either plant would cloud state efforts to meet carbon reduction goals established by the Legislature in 2007. And both spotlight the contrast between environmental rhetoric and economic realities when it comes to carbon reduction and energy exports...

(Emphasis added)

● *Oregon Governor Expands Drought Declaration* - Reuters 04/06/2015 By Courtney Sherwood

http://www.huffingtonpost.com/2015/04/06/oregon-drought_n_7014406.html

● *Kitzhaber declares drought emergency for four southern Oregon counties, opens up assistance*

By Bruce Hammond; Feb 14, 2014;

http://www.oregonlive.com/environment/index.ssf/2014/02/kitzhaber_declares_drought_eme.html

¹¹ *US Oysters, Scallops Getting Cooked by Acidic Seas*; Feb 23, 2015

<http://news.discovery.com/earth/oceans/us-oysters-scallops-getting-cooked-by-acidic-seas-150223.htm>

¹² ● Dr. Joseph T Morgan Oct 9, 2012, testimony concerning pollutants and the JCEP project:

http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20121018-5150

● "*An Exploratory Study of Air Quality near Natural Gas Operations*" - Peer-reviewed and accepted for publication by Human and Ecological Risk Assessment (November 9, 2012).

Theo Colborn, Kim Schultz, Lucille Herrick, and Carol Kwiatkowski

<http://www.endocrinedisruption.com/files/HERA12-137NGAirQualityManuscriptforwebwithfigures.pdf>

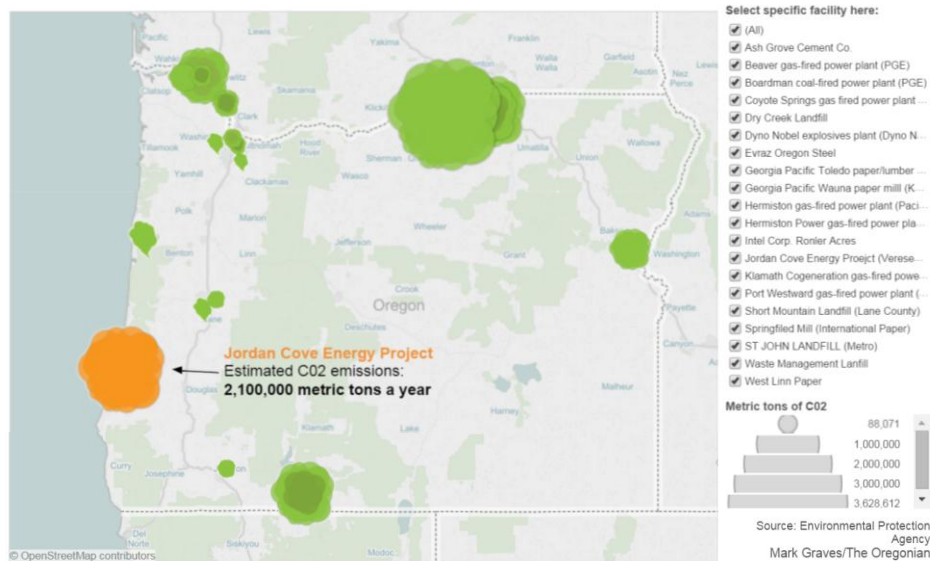
¹³ "*Jordan Cove LNG in Coos Bay could quickly become one of the largest greenhouse gas emitters in Oregon*"

By Ted Sickinger| The Oregonian/OregonLive ; November 18, 2014

http://www.oregonlive.com/business/index.ssf/2014/11/jordan_cove_lng_in_coos_bay_co.html

The top 20 carbon emitters in Oregon

Oregon's lone coal-fired power plant in Boardman had the biggest carbon footprint in the state during 2013, and a collection of gas-fired power plants were close behind. The Jordan Cove LNG terminal in Coos Bay, which has its own 420 megawatt power plant to liquefy gas, could quickly become one of, if not the largest emitter of carbon in Oregon when it opens.



AIR POLLUTION IMPACTS FROM LNG SHIPS, DELIVER POINTS AND POINTS OF CONSUMPTION.

DEQ representatives stated at the March 18, 2014, public meeting held in Coos Bay, Oregon that the LNG ships were not a part of their permit analysis. Despite this statement, Jordan Cove's LNG ships and all their necessary support vessels will contribute to a significant additional air pollution impact on local residents in the Coos Bay/ North Bend Area. Many people have moved here to get away from such impacts. The cumulative air pollution impacts should be included in DEQ's analysis utilizing the worst case scenarios that would occur and should include a full analysis of various vessel sizes used, number of shipments (which will exceed 90), and all the additional support safety and security measures that will be needed to safely transport LNG ships in and out of the Coos Bay harbor at full operational levels of the Jordan Cove facility.

Transoceanic transport and regasification of LNG is an energy intensive process. According to a life-cycle assessment prepared by researchers with the Tepper School of Business, and Department of Engineering and Public Policy Carnegie Mellon University comparing coal and LNG:

"The rated power of the LNG tankers ranges between 20 and 30 MW, and they operate under this capacity around 75% of the time during a trip (24, 25). The energy required to power this engine is 11.6MMBtu/MWh(26). As previously mentioned, some of this energy is provided by BOG and the rest is provided by fuel oil. A loaded tanker with a rated power of 20MW, and 0.12% daily boil-off rate would consume 3.88 million cubic feet of gas per day and 4.4 tons of fuel oil per day. The same tanker would consume 115 tons of fuel oil per day on they way back to the exporting country operating under ballast conditions. A loaded tanker with a rated power of 30 MW, and a 0.25% daily boil-off rate

would get all its energy from the BOG, with some excess gas being combusted to reduce risks of explosion (22). Under ballast conditions, the same tanker would consume 172 tons of fuel oil per day.

“For LNG imported in 2003 the average travel distance to the Everett, MA LNG terminal was 2700 nautical miles (13, 27). In the future LNG could travel as far as far as 11,700 nautical miles (the distance between Australia and the Lake Charles, LA LNG terminal (27)). This range of distances is representative of distances from LNG countries to U.S. terminals that could be located on either the East or West coasts. To estimate the number of days LNG would travel (at a tanker speed of 20 knots (22)), these distances were used. This trip length can then be multiplied by the fuel consumption of the tanker to estimate total trip fuel consumption and emissions, and these can then be divided by the average tanker capacity to obtain a range of emission factors for LNG tanker transport between 2 and 17 lb CO₂ equiv/MMBtu.

“Regasification emissions were reported by Tamura et al. to be 0.85 lb CO₂ equiv/MMBtu (21). Ruether et al. report an emission factor of 3.75 lb of CO₂ equiv/MMBtu for this stage of the LNG life-cycle by assuming that 3% of the gas is used to run the regasification equipment (28). The emission reported by Tamura et al. differs because they assumed only 0.15% of the gas is used to run the regasification terminal, while electricity, which maybe generated with cleaner energy sources, provides the additional energy requirements. These values were used as lower and upper bounds of the range of emissions from regasification of LNG.”¹⁴

These researchers with Carnegie Mellon University concluded.

“In addition to LNG, SNG has been proposed as an alternative source to add to the natural gas mix. The decision to follow the path of increased LNG imports or SNG production should be examined in light of more than just economic considerations. In this paper, we analyzed the effects of the additional air emissions from the LNG/SNG life-cycle on the overall emissions from electricity generation in the United States. We found that with current electricity generation technologies, natural gas life-cycle GHG emissions are generally lower than coal life-cycle emissions, even when increased LNG imports are included. However LNG imports decrease the difference between GHG emissions from coal and natural gas... ..It is also important to note that upstream GHG emissions of NG/LNG/SNG have a higher impact in the total life-cycle emissions than upstream coal emissions. This is a significant point when considering a carbon-constrained future in which combustion emissions are reduced.”¹⁵

¹⁴ Jaramillo, P., et al (Sep 2007) “Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation Environ Sci Technol. 41(17):6290-6.
http://www.fossil.energy.gov/programs/gasregulation/authorizations/2011_applications/exhibits_11-128-LNG/32_Jaramillo_ComparativeLCACoalNG.pdf

¹⁵ Ibid., at page 6294.

The magnitude of the environmental benefits of natural gas fade away when natural gas is liquefied for export and importation. **In general, natural gas supplies should be consumed on the continent they are produced, without liquefaction.**

2. Liquefaction of natural gas for export/import is energy intensive and greatly diminishes the benefits of using natural gas

The liquefaction of natural gas requires a great amount of energy to compress methane into a liquid. This inherently wastes a substantial portion of the natural gas, which is burned in order to provide power to run compressors at liquefaction facilities. According to Jordan Cove's own study:

"Approximately 6.2 percent of the gas delivered to the JCEP terminal would be either consumed as fuel to operate the liquefaction process or be removed from the feed gas stream (trace sulfur compounds, carbon dioxide, nitrogen and water) prior to or during the liquefaction step. Any hydrocarbons recovered that have a higher molecular weight than methane will fuel the power plant."¹⁶ (Emphasis added).

3. The DOE's economic analysis rests on the mistaken assumption that U.S. water supplies will be adequate to sustain increased production of natural gas by hydraulic fracturing

Hydraulic fracturing consumes large quantities of water and the continued burgeoning use of hydraulic fracturing rests on assumptions that water supplies will, in the future, be adequate to sustain the continued increased use of this technology.

However, this assumption is likely to be wrong. According to the Pacific Institute:

"There is some evidence that the water requirements for hydraulic fracturing are already creating conflicts with other uses and could constrain future natural gas production in some areas. For example, in Texas, a major drought in 2011 prompted water agencies in the region to impose mandatory reductions in water use. Water agencies, some of which sold water to natural gas companies, indicated they might have to reconsider these sales if the drought persisted. Natural gas companies also tried to purchase water from local farmers, offering \$9,500 to nearly \$17,000 per million gallons of water (Carroll 2011). Likewise, at an auction of unallocated water in Colorado during the spring 2012, natural gas companies successfully bid for water that had previously been largely claimed by farmers, raising concerns among some about the impacts on agriculture in the region and on ecosystems dependent on return flows (Finley 2012).

"Concerns over water availability are not limited to drier climates. Pennsylvania is generally considered a relatively water-rich state. However, in August 2011, 13

¹⁶ ECONorthwest Construction Impact Study, at page 4.
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previously approved water withdrawal permits in Pennsylvania’s Susquehanna River Basin were temporarily suspended due to low stream levels; 11 of these permits were for natural gas projects (Susquehanna River Basin Commission 2011). While parts of the state were abnormally dry, the basin was not experiencing a drought at the time, suggesting that natural gas operations are already creating conflict with other uses under normal conditions. In many basins, the application of fracking is still in its infancy and continued development could dramatically increase future water requirements and further intensify conflicts with other uses.”¹⁷

For several years now the United States has been experiencing some of the worst draughts in over 60 years, and this is affecting energy production in the United States. A 2012 editorial in the New York Times stated the following:

“We’re now in the midst of the nation’s most widespread drought in 60 years, stretching across 29 states and threatening farmers, their crops and livestock. But there is another risk as water becomes more scarce. Power plants may be forced to shut down, and oil and gas production may be threatened.

“Our energy system depends on water. About half of the nation’s water withdrawals every day are just for cooling power plants. In addition, the oil and gas industries use tens of millions of gallons a day, injecting water into aging oil fields to improve production, and to free natural gas in shale formations through hydraulic fracturing.”¹⁸

A Jan. 20, 2016 article by Justin Gillis in the New York Times titled “2015 Was Hottest Year in Historical Record, Scientists say” states: (See Exhibit 13)

Scientists reported Wednesday that 2015 was the hottest year in the historical record by far, breaking a mark set only the year before — a burst of heat that has continued into the new year and is roiling weather patterns all over the world.

In the contiguous United States, the year was the second-warmest on record, punctuated by a December that was both the hottest and the wettest since record-keeping began. One result has been a wave of unusual winter floods coursing down the Mississippi River watershed.

Scientists started predicting a global temperature record months ago, in part because an El Niño weather pattern, one of the largest in a century, is releasing an immense amount of heat from the Pacific Ocean into the atmosphere. But the bulk of the record-setting heat, they say, is a consequence of the long-term planetary warming caused by human emissions of greenhouse gases. (Emphasis added)

“The whole system is warming up, relentlessly,” said Gerald A. Meehl, a scientist at the National Center for Atmospheric Research in Boulder, Colo.

¹⁷ Pacific Institute (June 2012) "Hydraulic Fracturing and Water Resources: Separating the Frack from the Fiction." http://pacinst.org/reports/fracking/full_report.pdf

¹⁸ Webber, E. (July 23rd, 2012) “Will Drought Cause the Next Blackout?” The New York Times.

While we have not run out of water supplies locally in the Coos Bay area, our water levels did drop considerably in August at the same time other parts of the State and Northwest were in extreme drought conditions. (See Exhibit 14) As explained in the attached May 22, 2015, article by Representative Dan Rayfield:
(See Exhibit 15)

California is in a state of emergency. Mountain snowpack is at a record low, and many of its lakes and streams are at all-time lows. Mandatory water use restrictions have been put into place for the first time in California's history, and communities have been ordered to cut water use by an average of 25 percent. Outside the cities, farmers left more than 500,000 acres unplanted last year due to lack of water. That number will grow this year. In the Sierras, more than 12 million trees have died, with millions more expected to die this summer.

Here in Oregon, extreme drought is creeping north from California. Gov. Brown has already declared drought emergencies in 15 counties. It may look green outside today, but that creek in your community is probably running at levels typical of August. These problems, in combination with heat and no snow, suggest our water challenges are just beginning....

The Scientific American reported on June 3, 2015, that the record-breaking drought in California—brought about by a severe lack of precipitation, especially mountain snows—had exacted a \$2.7 billion toll on the state's economy because of agricultural losses.¹⁹ The drought has prompted louder and louder calls for California to rethink how it handles and allocates its water supply, particularly in a climate that is warming and changing and could bring more such droughts in the future. (See Exhibit 16)

For example, if projects like the Jordan Cove LNG export project were to be approved and their LNG export facility built in Coos Bay, then this facility would be contractually bound to continue LNG exports to Asia regardless of whether future drought conditions would constrain the use of hydraulic fracturing to produce natural gas domestically. This would drive up U.S. natural gas prices and would hurt consumers and businesses in the United States by indirectly causing water shortages and exacerbating water scarcity. **This would not be in the public interest.**

Our water resources are extremely valuable and the legislature and regulatory agencies need to be making sure that there is a sufficient independent monitoring program in place that protects this resource.

¹⁹ *Drought Takes \$2.7-Billion Toll on California Agriculture - Scientists say the current drought will cost big in lost crops* ; By Andrea Thompson and Climate Central | June 3, 2015 | <http://www.scientificamerican.com/article/drought-takes-2-7-billion-toll-on-california-agriculture/>
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4. The DOE Study is not in line with multiple current financial and gas industry reports on the viability of exporting LNG from the U.S.

On October 9, 2015, the Natural Gas Intelligence reported the following in an article by Richard Nemec titled, “*West Coast LNG Export Projects Doubtful in Current Environment, Analysts Say*”²⁰: (See Exhibit 17)

In the current oversupplied global energy market, a liquefied natural gas (LNG) export terminal on the U.S. West Coast is unlikely to become a reality anytime soon, according to several industry analysts speaking at a natural gas forum in Los Angeles.

*The consensus at the LDC Gas Forum Rockies & the West conference is that the **five terminals now under construction or about to start on the Gulf and East Coasts are the only ones likely to be operating by 2020.** Combined, they represent incremental demand growth of 10.5 Bcf/d in the world market, which is somewhat saturated already.*

That scenario leaves out the two proposed export projects in Oregon -- Jordan Cove and Oregon LNG -- which are in the midst of the permitting process at the Federal Energy Regulatory Commission.

"There is debate about how much U.S. LNG can make it into the global market," said David Braziel, director of finance and fundamental analysis at RBN Energy LLC. "If all the U.S. LNG export facilities that have been proposed were built (45 Bcf/d), the capacity would dwarf the global market." There are other significant LNG exporters worldwide, including Canada, Australia, Indonesia, East Africa and Russia, he said.

*RBN thinks 33% of the global market for U.S. LNG is a reasonable assumption, Braziel said, but that leaves no room for the West Coast facilities. "Thirty percent would be about 12 Bcf, and there is already 13.2 Bcf/d of capacity being built, so that's how we get to our [one-third] estimate and **there is nothing beyond the five terminals [Sabine Pass, Freeport, Cameron, Corpus Christi and Cove Point, MD].**" ... (Emphasis added)*

On September 3, 2015, the Financial Post reported the following in an article by Yadullah Hussain titled, “*Window of opportunity’ for new LNG projects is gone because of supply glut, consultancy says*”²¹: (See Exhibits 18 and 19)

***The window to build liquefied natural gas projects in Canada and elsewhere has closed amid a global supply glut,** says global energy consultancy Wood Mackenzie.*

“There is a clear reluctance by companies to stand down, but the reality is that the window of opportunity closed over six months ago for everyone, not just for

²⁰ <http://www.naturalgasintel.com/articles/103968-west-coast-lng-export-projects-doubtful-in-current-environment-analysts-say>

²¹ <http://business.financialpost.com/news/energy/window-of-opportunity-for-new-lng-projects-is-gone-because-of-supply-glut-consultancy-says?>

Canada” Noel Tomnay, vice-president global gas and LNG research for Wood Mackenzie said in an interview.

Qatar and Australia led the first two waves of LNG development with the U.S. spearheading the third wave, even as Canadian and East Africa proposals were stalled.

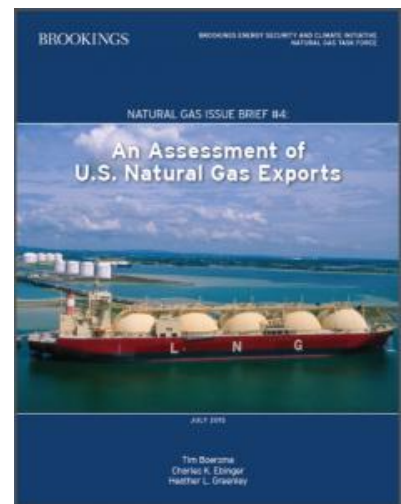
“Canada’s biggest competitor is not the U.S. – it is probably Mozambique.” Tomnay said, noting that these two regions would probably play the role of niche, “strategic resources” for investors in the next wave of development that will cater to demand after 2022. ... (Emphasis added)

On July 14, 2015, Fuel Fix stated in another article by By Rhiannon Meyers titled, “Most U.S. LNG projects won’t cross the finish line, new study says”²²:

Most of the proposed U.S. liquefied natural gas export projects won’t get built amid stiffening competition from foreign competitors who will flood the market with the supercooled gas as demand begins to slow, a new study finds.

Five U.S. LNG projects already under construction, including Cheniere’s two terminals in Louisiana and Corpus Christi, will cross the finish line, but beyond that, construction appears “increasingly unlikely” for the remaining proposals, according to the latest study unveiled Tuesday by a task force of natural gas experts assembled by the Brookings Institution, a Washington D.C.-based thinktank.

It’s the latest report to raise doubts about the flurry of multi-billion dollar proposals announced in recent years that would soak up vast supplies of cheap U.S. natural gas destined for markets in Asia.... (Emphasis added)



The task force of natural gas experts assembled by the Brookings Institution stated that it will be increasingly unlikely that new liquefaction projects will be financed, beyond the ones that have been contracted and reached a final investment decision. The July 2015 Brookings Report, “An Assessment of U.S. Natural Gas Exports,” is attached as *Exhibit 20*.

A July 7, 2015, Sutherland LNG Blog Posting titled, “New Report Projects \$283 Billion of Planned LNG Projects Potentially Unneeded by 2025,”²³ reported on a Carbon Tracker report: “Carbon Supply Cost Curves: Evaluating financial risk to gas capital expenditures.”²⁴ Figure 11

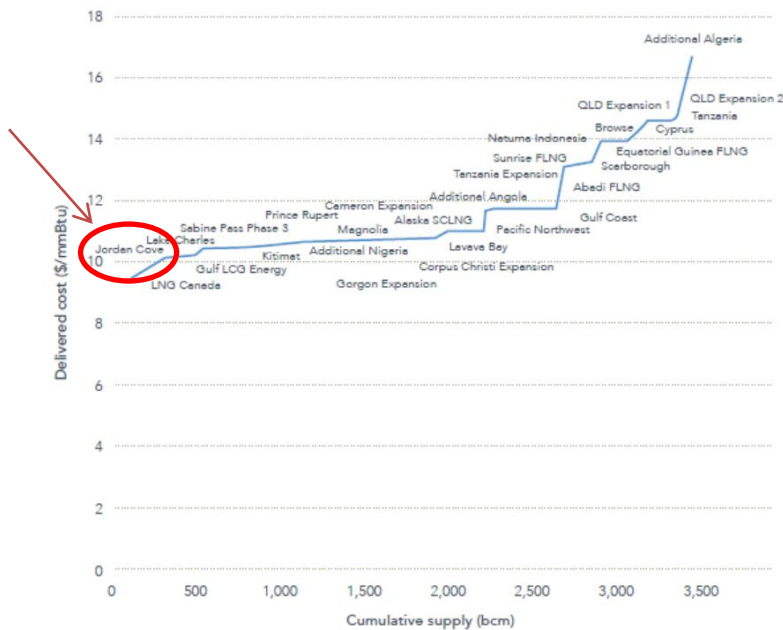
²² <http://fuelfix.com/blog/2015/07/14/most-u-s-lng-projects-wont-cross-the-finish-line-new-study-says/#27079101=0>

²³ <http://www.lnglawblog.com/2015/07/new-report-projects-283-billion-of-planned-lng-projects-potentially-unneeded-by-2025/>

²⁴ <http://www.carbontracker.org/wp-content/uploads/2015/06/CTI-gas-report-Final-WEB.pdf>

on page 23 of the Carbon Tracker report list Jordan Cove as one of the many “not needed” LNG Export projects. The Carbon Tracker Report is attached as *Exhibit 21*.

Figure 11: LNG projects not needed in low demand scenario to 2035



Moody’s Investors Service published a Moody’s Announcement on April 7, 2015, “*Liquefied natural gas projects nixed amid lower oil prices*,”²⁵ which stated the following: (See Exhibit 22)

New York, April 07, 2015 — Liquefied natural gas (LNG) suppliers are curtailing their capital budgets, amid low oil prices and a coming glut of new LNG supply from Australia and the US, Moody’s Investors Service says in a new report, “Lower Oil Prices Cause Suppliers of Liquefied Natural Gas to Nix Projects.” ...

...Moody’s says low LNG prices will result in the cancellation of the vast majority of the nearly 30 liquefaction projects currently proposed in the US, 18 in western Canada, and four in eastern Canada.

“The drop in international oil prices relative to US natural gas prices has wiped out the price advantage US LNG projects, ... (Emphasis added)

*...Greenfield projects on undeveloped property are much more expensive, involve more construction risk, and take longer to build than brownfield projects, which re-purpose existing LNG regasification sites. **Greenfield projects are also frequently challenged by local opposition and occasionally by untested laws and regulations.** Based on the public*

²⁵ https://www.moodys.com/research/Moodys-Liquefied-natural-gas-projects-nixed-amid-lower-oil-prices--PR_322439

estimates of companies building new LNG liquefaction capacity, the median cost to build a US brownfield project is roughly \$800 per ton of capacity, compared with the more advanced Australian greenfield projects, now estimated at around \$3,400 per ton... (Emphasis added)

A September 9, 2013 Navigant report prepared for Jordan Cove LNG L.P. titled, “*Supply and Demand Market Assessment and Surplus Evaluation Report*” stated the following:
(See Exhibit 23)

It should be noted that Navigant considers the upper end of the volume ranges discussed here for Canadian LNG exports with respect to resource life (i.e., 15 Bcfd) to be quite high, and unlikely. Navigant’s current view is that the likely development of North American liquefaction capacity for export is in the 8-10 Bcfd range, with 6-8 Bcfd from the U.S. and about 2 Bcfd from Canada, meaning that the scenario of 4.75 Bcfd of Canadian LNG exports (based on approved projects) should be viewed as a high export assumption. (Emphasis added)

Jordan Cove and Pacific Connector have recently informed the FERC that their project DOES NOT CURRENTLY HAVE SIGNED CONTRACTS.²⁶

5. The harm that increased LNG Exports would inflict on U.S. manufacturing / jobs was not fully considered.

Exporting gas would cause families and businesses to compete on a world market for natural gas. Exporting LNG would increase the price of natural gas for American consumers and manufacturers, cost jobs, and create a financial burden in an already stressed American economy.²⁷ Previous DOE studies have shown this could raise natural gas prices by as much as 54%.²⁸ This threatens U.S. jobs where factories depend on natural gas. The entire Jordan Cove Energy Project would create only 145 permanent jobs in Coos Bay, with many of those being out-of-state hires, where more than 120 manufacturing projects valued at nearly \$110 billion of economic investment, including thousands of new jobs, would be at risk due to LNG Exports.²⁹ Rising natural gas prices would also mean increased usage of coal in power generation.³⁰

²⁶ http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20151104-5142

²⁷ • EIA “*Effect of Increased Natural Gas Exports on Domestic Energy Markets*” – Jan 2012:

http://energy.gov/sites/prod/files/2013/04/f0/fe_eia_lng.pdf

• Representative Edward J. Markey (March 2012) “*Drill Here, Sell There, Pay More: The Painful Price of Exporting Natural Gas.*”

http://democrats.naturalresources.house.gov/sites/democrats.naturalresources.house.gov/files/2012-03-01_RPT_NGReport.pdf

²⁸ Bloomberg “*Exports of LNG May Raise U.S. Prices as Much as 54%, Agency Says*” By Katarzyna Klimasinska, Jan 19, 2012 <http://www.bloomberg.com/news/articles/2012-01-19/lng-exports-may-spur-higher-u-s-natural-gas-prices-report-says>

²⁹ Press Release - “*America’s Energy Advantage Files LNG Export Motion, Seeks Rulemaking on Public Interest Test*” Sept 18, 2013 <http://www.reuters.com/article/2013/09/18/dc-americas-energy-idUSnPNCG82555+1e0+PRN20130918>

³⁰ • “*With Rising Natural Gas Prices, Utilities Turn Back to Coal*” ; May 29, 2013 Sustainable Business.com News ; <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/24926>

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In a Press Release dated March 25, 2014, DOW Chemical made the following statement concerning the proposed Jordan Cove LNG Export facility: (*See Exhibit 24*)

Dow is carefully reviewing today's decision by the Department of Energy (DOE) to approve the seventh application for the export of liquefied natural gas (LNG), this from the proposed Jordan Cove LNG facility. Dow and other manufacturers have consistently advocated for a measured and balanced approach to permit approvals. Today's announcement brings the total amount of export licenses approved to non-FTA countries to more than 9.2 bf/day, a level which many researchers and economists conclude could drive natural gas price increases, greatly affect consumer costs, and have repercussions throughout the U.S. economy.

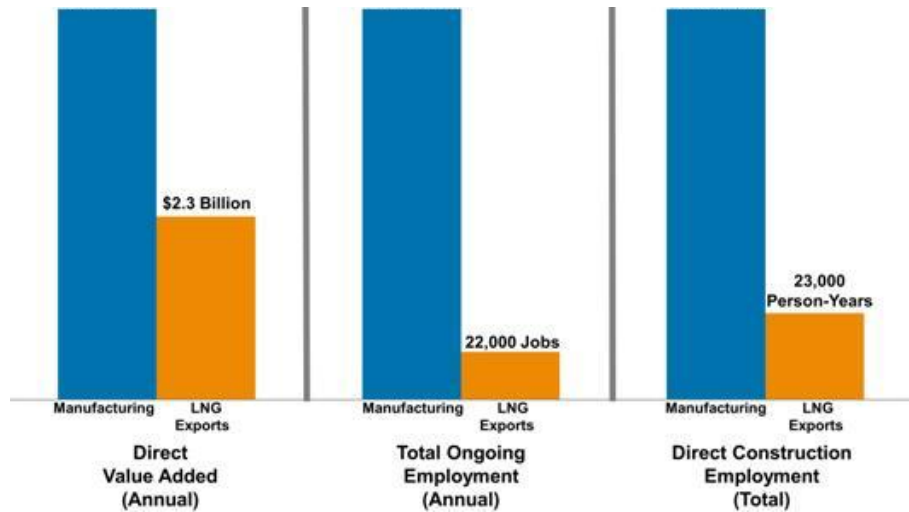
Domestic and foreign investment in the United States, spurred by the promise of abundant and affordable supplies of energy, is driving an American manufacturing renaissance. This rising movement - to make things in America - is fueling job creation and economic growth. Approving natural gas exports without fully understanding the implications to the U.S. manufacturing sector jeopardizes this economic recovery and the new jobs that flow from it (Emphasis added)

A February 25, 2013, report prepared by Charles River Associates titled, “*US Manufacturing and LNG Exports: Economic Contributions to the US Economy and Impacts on US Natural Gas Prices,*” showed the following: (*See Exhibit 25*)

- US manufacturing contributes more to GDP, employment, and the reduction of the trade deficit as compared to LNG exports
- Manufacturing is highly sensitive to natural gas prices, and a significant portion of the US manufacturing sector is exposed to impacts from projected increased natural gas prices.

U.S. Manufacturing Jobs contribute more than LNG Export Jobs:

• U.S. Energy Information Administration – “*Natural gas generation lower than last year because of differences in relative fuel prices*” – September 25, 2013; <http://www.eia.gov/todayinenergy/detail.cfm?id=13111&src=email>



In allowing more exports, the U.S. may be “trading away the enormous economic advantage of having large, low-cost domestic natural gas supply,” Oregon Senator Ron Wyden said in an e-mailed statement on Jan. 6, 2012, as reported by the Bloomberg news.³¹ From 2010 to 2012, energy-intensive manufacturers added almost 200,000 U.S. jobs to the economy and increased real sales by more than \$120 billion.³²

6. The DOE study did not consider the economic costs of threats due to hazards associated with LNG developments.

According to a September 9, 2003 CRS Report for Congress titled, “Liquefied Natural Gas (LNG) Infrastructure Security: Background and Issues for Congress,”³³ by Paul W. Parfomak, Specialist in Science and Technology Resources, Science, and Industry Division: (See Exhibit 26)

Page CRS-17:

...The Coast Guard Program Office estimates that it currently costs the Coast Guard approximately \$40,000 to \$50,000 to “shepherd” an LNG tanker through a delivery to the Everett terminal, depending on the duration of the delivery, the nature of the security escort, and other factors.³⁴ **State and local authorities also incur costs for overtime police, fire and security personnel overseeing LNG tanker deliveries. The state of Massachusetts and the cities of Boston and Chelsea estimated they spent a combined**

³¹ Bloomberg “Exports of LNG May Raise U.S. Prices as Much as 54%, Agency Says” By Katarzyna Klimasinska, Jan 19, 2012 <http://www.bloomberg.com/news/articles/2012-01-19/lng-exports-may-spur-higher-u-s-natural-gas-prices-report-says>

³² Dow Chemical Press Release Statement on U.S. Department of Energy Jordan Cove LNG Export Decision Midland, MI - 03/25/2014

³³ <http://www.au.af.mil/au/awc/awcgate/crs/rl32073.pdf>

³⁴ U.S. Coast Guard, Program Office. Personal communication. August 12, 2003. This estimate is based on boat, staff and administrative costs for an assumed 20-hour mission

\$37,500 to safeguard the first LNG shipment to Everett after September 11, 2001.³⁵ Based on these figures, the public cost of security for an LNG tanker shipment to Everett is on the order of \$80,000, excluding costs incurred by the terminal owner... (Emphasis added)

A report titled, “*Brittle Power, Energy Strategy for National Security*,” originally prepared for the Pentagon, determined the following: (See Exhibit 27)

Pages 1 to 10

The United States has for decades been undermining the foundations of its own strength. It has gradually built up an energy system prone to sudden, massive failures with catastrophic consequences.

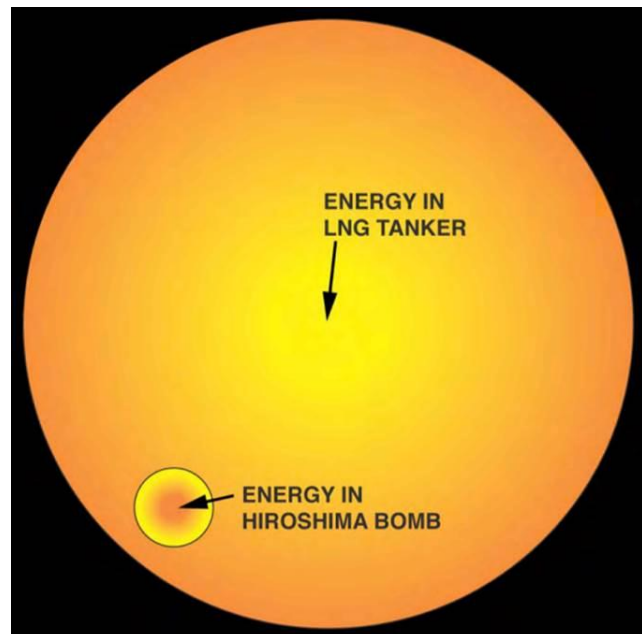
The energy that runs America is brittle—easily shattered by accident or malice. That fragility frustrates the efforts of our Armed Forces to defend a nation that literally can be turned off by a handful of people. It poses, indeed, a grave and growing threat to national security, life, and liberty...

...Threats which can be identified in advance include

- *natural events;*
- *aggressive physical acts (war, terrorism, and sabotage, all considered more fully in Chapter Seven);*
- *failures of complex technical and economic systems; and*
- *accidental failure or deliberate disruption of the devices that control these systems.*

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...An LNG fireball can blow through a city, creating “a very large number of ignitions and explosions across a wide area. No present or foreseeable equipment can put out a very large [LNG]... fire.”⁷ The energy content of a single standard LNG tanker (one hundred twenty-five thousand cubic meters) is equivalent to seven-tenths of a megaton of TNT, or about fifty-five Hiroshima bombs. (Emphasis added)



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...unless tackled directly, the clear and present dangers from present LNG and—on a far greater scale—LPG operations will persist. Later chapters will show that all the energy

³⁵ McElhenny, John. “State Says LNG Tanker Security Cost \$20,500.” Associated Press. November 2, 2001. p1. CALNG/McCaffree - Feb12, 2016 Comment - FR-2015-32590

now supplied by LNG and LPG can be replaced by much cheaper sources which do not compromise national security. (Emphasis added)

The U.S. Chemical and Safety Board's (CSB) Oct 21, 2015, Final Decision on a fire that occurred at a Caribbean Petroleum terminal facility in Puerto Rico "*Final Investigation Report - Caribbean Petroleum Tank Terminal Explosion And Multiple Tank Fires*" calls for **increased safety measures and stricter regulations in order to prevent similar events from occurring in the U.S.**³⁶

Page 56 of this report states:

*...The CSB determined that existing regulatory, industry, and consensus **standards do not adequately protect workers and the public from the dangers posed by bulk petroleum storage tank terminals.** The following section discusses shortcomings of the regulatory, standard and recommended practice framework governing this industry. (See Figure 17.)* (Emphasis added)

The U.S. Chemical and Safety Board's (CSB) Jan 29, 2016 Final Decision on a report titled, "*West Fertilizer Company Fire And Explosion (15 Fatalities, More Than 260 Injured)*"³⁷ stated the following:

...CSB's analysis of the emergency response, found in Section 7, concludes that the West Volunteer Fire Department did not conduct pre-incident planning or response training at WFC, was likely unaware of the potential for FGAN detonation, did not take recommended incident response actions at the fire scene, and did not have appropriate training in hazardous materials response.

CSB found several shortcomings in federal and state regulations and standards that could reduce the risk of another incident of this type. *These include the Occupational Safety and Health Administration's Explosives and Blasting Agents and Process Safety Management standards, the Environmental Protection Agency's Risk Management Program and Emergency Planning and Community Right-to-Know Act, and training provided or certified by the Texas Commission on Fire Protection and the State Firefighters' and Fire Marshals' Association of Texas.* (Emphasis added)

*CSB's complete analysis is presented in Section 8. **The location of the WFC relative to the surrounding community exacerbated the offsite consequences, leading CSB to assess whether other FGAN storage facilities could pose significant offsite risks.** CSB's analysis shows that the risk to the public from a catastrophic incident exists at least*

³⁶ <http://www.csb.gov/csb-approves-final-investigation-report-and-video-from-2009-explosion-and-fire-at-caribbean-petroleum-terminal-facility-in-puerto-rico-report-finds-inadequate-management-of-gasoline-storage-tank-overfill-hazard/>

³⁷ <http://www.csb.gov/csb-board-approves-the-west-fertilizer-company-report-and-recommendations-with-a-unanimous-vote/>

within the state of Texas, if not more broadly. For example, 19 other Texas facilities storing more than 10,000 pounds of FGAN are located within 0.5 miles of a school, hospital, or nursing home, raising concerns that an incident with offsite consequences of this magnitude could happen again. Section 9 explores the connection between land use planning and offsite consequences.... (Emphasis added)

7. The DOE Study did not consider the impact renewables are having in the marketplace.

RENEWABLE ENERGY SYSTEMS ARE A VIABLE ALTERNATIVE TO LNG EXPORTS

A January 15, 2016 report by the Brattle Group titled, *LNG and Renewable Power – Risk and Opportunity in a Changing World* states the following: (See Exhibit 28)

VII. Conclusions

Our analysis suggests that even though the availability of substantial supplies of low-cost unconventional gas resources in North America would point to significantly increased market potential for LNG exported to Asia and perhaps Europe, the traditional comparison of delivered LNG prices to prevailing oil prices may miss an important dynamic, namely the fast progress of renewable energy technologies capable of providing an alternative to one or more of the major sources of demand for LNG, electricity production and in the future perhaps heating....

...More generally, some of the important risks facing LNG markets include:

- Risk to project developers, owners of LNG projects, and LNG export capacity holders due to uncertainties related to gas and ultimately LNG demand (and LNG prices);*
- Stranded asset/contract risk;*
- Price risks for counterparties related to price review clauses in LNG contracts;*
- Competition from pipeline imports or LNG imports from other regions, or from the development of indigenous gas supplies;*
- Risk for potential buyers that commit to a long-term LNG contract (and associated infrastructure) in light of the potential for locally sourced renewable energy to be cheaper; and*
- Risk for third party financiers to tie up large amount of investment dollars for potentially marginal infrastructure investments....*

...As our analysis has shown, even with relatively moderate carbon prices, the economics shift significantly in favor of renewable energy, creating an additional and likely substantial risk for LNG as a fuel in a likely increasingly carbon-constrained future.

100% Renewable Energy is not only possible in the United States but across the globe. (See Exhibit 29) We want an expanded vision for clean, renewable and sustainable energy in Oregon

and in the United States. (See Exhibit 30). Exporting Fracked Liquefied Natural Gas (LNG) would defeat that goal.

The Federal Energy Regulatory Commission (FERC) responded to our comments concerning renewable energy technology being a viable alternative to the Jordan LNG Export project in the Jordan Cove Final Environmental Impact Statement (EIS) (FEIS page W-404):

*CO39-36: Renewable energy options are discussed in section 3.1.4 of the EIS. **Because the Project's purpose is to prepare natural gas for export to foreign and domestic markets, the development or use [of] renewable energy technology would not be a reasonable alternative to the proposed action.** (Emphasis added)*

This response does not line up with International, National, and Local agreements that obligate agencies such as the FERC to begin reducing greenhouse gases "as soon as possible."

On May 5, 2015 Forbes reported in an article titled, *Why Tesla Batteries are Cheap Enough to Prevent New Power Plants*³⁸ the following:

Earlier Thursday night, I was covering a Northwestern University debate on the future of nuclear energy, in which the nuclear critic Arnie Gundersen predicted Tesla's new utility-scale battery would render new-build nuclear plants obsolete. The battery would be cheap enough to solve the reliability problem of intermittent solar and wind, he predicted, providing a cheaper alternative to nuclear power's 24-hour output....

...At Tesla's price, utility-scale batteries have the potential to perform better than 2 cents per kilowatt hour where it counts the most: on the customer's electric bill. The capital cost of utility-scale batteries may be more than offset by their benefits, according to the Texas study, and if deployed at the grid level, they could actually lower electric bills ...

...Ramez Naam thinks that both Gundersen's optimistic 2¢ (for the Powerpack) and my Forbes colleague Chris Helman's pessimistic 50¢ (for the Powerwall) are outliers in the range of possibilities for the cost of electricity flowing through Tesla batteries. If utilities get the same 10-year warranty Tesla offers to home customers, Naam estimates the Powerpack's cost per kWh will be 7¢, he told me via Twitter. Even at twice that price, he said, grid-level batteries offer utilities a return on investment now:

"That batteries bring positive ROI at such a price surprises lots of people."

And it means windmills + batteries may be cheaper than nuclear plants right now, with windmills + solar panels likely to follow.

³⁸ <http://www.forbes.com/sites/jeffmcmahon/2015/05/05/why-tesla-batteries-are-cheap-enough-to-prevent-new-power-plants/>

CONCLUSION

The U.S. DOE should be looking and observing what is going on in other countries that have or are building massive LNG export projects. A November 2015 report out of Australia titled, “*Be careful of what you wish for - The economic impacts of Queensland’s unconventional gas experiment and the implications for Northern Territory policy makers,*” states:

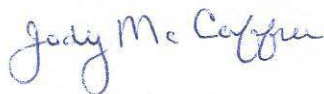
Gas companies routinely exaggerate the economic and jobs benefits of their projects. Policy makers often accept these claims unquestioningly.

The Northern Territory is fortunate to have the Queensland unconventional gas experiment to reflect upon. The Queensland experience is that most of the economic benefits do not materialise, and serious collateral damage is done to existing industries and local communities. (Emphasis added)

If policy makers in the Northern Territory naively accept the economic claims of speculative gas companies and use taxpayer money to support this industry, Territorians will live the consequences for decades to come.

It is past time for the U.S. and the International market to transition away from building more energy infrastructure projects dependent on more fossil fuels. Exporting up to 20 Bcf/d of LNG from the United States is not sustainable nor is it realistic given the current glut of LNG in the international market and the fact that other LNG projects already being built elsewhere will continue to keep that glut going for years to come. Meanwhile, cleaner, cheaper, more reliable, and safer energy systems currently exist. There is no reason for the U.S. DOE to subject the American people to more outdated and failed energy projects like they did with the Washington Public Power Supply System’s (WPPSS, aka “Whoops”) failed nuclear power plants in the 1980’s. The data used to justify the building of those now defunct nuclear plants obviously was in error. The time has come for the U.S. DOE to transition us away from destructive and hazardous energy systems into an energy future that is cleaner, safer and truly sustainable.

Sincerely,



Jody McCaffree

CALNG / McCaffree
Index for Exhibits
For February 12, 2016 Testimony on
U.S. DOE Economic Consulting Studies FR Doc No: 2015-32590

Exhibit 1: December 12, 2015, 195 Nation global warming pact of the COP21 Climate Conference in Paris

Exhibit 2: May 19, 2015 Global Climate Leadership Memorandum Of Understanding (MOU)

Exhibit 3: October 28, 2013 Pacific Coast Action Plan on Climate and Energy.

Exhibit 4: *Ignore climate change and 100m people will die by 2030, shocking new report claims*
By Daily Mail Reporter; Published: 26 September 2012 |
<http://www.dailymail.co.uk/sciencetech/article-2208953/Shock-report-claims-100m-people-die-economic-growth-drop-3-2-2030-climate-change-ignored.html>

Exhibit 5: Dara Press Release of Report: Climate Crisis Already Causing Unprecedented Damage to World Economy; Human Impact On Large-Scale
New York, Wednesday 26 September 2012

Exhibit 6: Dara Executive and Technical Summary of Report: *Climate Vulnerability Monitor - A Guide To The Cold Calculus Of A Hot Planet*

Exhibit 7: CALNG August 6, 2012, Motion to Intervene, Protest and Comments sent to the DOE regarding the Jordan Cove Energy Project, L.P., FE Docket No. 12-32-LNG

Exhibit 8: “*OIL AND GAS Information on Shale Resources, Development, and Environmental and Public Health Risks*”; By U.S. Government Accountability Office, September 2012

Exhibit 9: “*LOOK BEFORE THE LNG LEAP - Why Policymakers and the Public Need Fair Disclosure Before Exports of Fracked Gas Start*”; By Craig Segall, Staff Attorney, Sierra Club Environmental Law Program.

Exhibit 10: “*Gas Bubble Leaking, About to Burst*” by Richard Heinberg, originally published by Post Carbon Institute | Oct 22, 2012

Exhibit 11: The New York Times “*Exports of American Natural Gas May Fall Short of High Hopes*” January 4, 2013

Exhibit 12: “*Fracking by the Numbers – Key Impacts of Dirty Drilling at the State and National Level,*” Oct 2013

Exhibit 13: The New York Times - *2015 Was Hottest Year in Historical Record, Scientists Say* By Justin Gillis; Jan. 20, 2016; http://www.nytimes.com/2016/01/21/science/earth/2015-hottest-year-global-warming.html?_r=0

Exhibit 14: *Oregon Governor Expands Drought Declaration*; By Courtney Sherwood – Reuters; 04/06/2015 http://www.huffingtonpost.com/2015/04/06/oregon-drought_n_7014406.html

Exhibit 15: *Oregon must avoid California's water plight (OPINION)*; By Guest Columnist Rep. Dan Rayfield; May 22, 2015; http://www.oregonlive.com/opinion/index.ssf/2015/05/oregon_must_avoid_californias.html

Exhibit 16: *Drought Takes \$2.7-Billion Toll on California Agriculture - Scientists say the current drought will cost big in lost crops* ; By Andrea Thompson and Climate Central | June 3, 2015 | <http://www.scientificamerican.com/article/drought-takes-2-7-billion-toll-on-california-agriculture/>

Exhibit 17: Natural Gas Intelligence “*West Coast LNG Export Projects Doubtful in Current Environment, Analysts Say*”; by Richard Nemec; October 9, 2015

Exhibit 18: Financial Post “*Window of opportunity’ for new LNG projects is gone because of supply glut, consultancy says*” By Yadullah Hussain | September 3, 2015 | <http://business.financialpost.com/news/energy/window-of-opportunity-for-new-lng-projects-is-gone-because-of-supply-glut-consultancy-says?>

Exhibit 19: WorldOil.Com *Wood Mackenzie: Where are all the LNG project postponements?* 9/4/2015

Exhibit 20: *An Assessment of U.S. Natural Gas Exports*; July 2015; By the Brookings Energy Security and Climate Initiative Natural Gas Task Force . Natural Gas Issue Brief #4

Exhibit 21: Carbon Tracker report: “*Carbon Supply Cost Curves: Evaluating financial risk to gas capital expenditures.*” <http://www.carbontracker.org/wp-content/uploads/2015/06/CTI-gas-report-Final-WEB.pdf>

Exhibit 22: Moody’s Investors Service -April 7, 2015 Announcement: “*Moody's: Liquefied natural gas projects nixed amid lower oil prices.*”

Exhibit 23: September 9, 2013 Navigant report, “*Supply and Demand Market Assessment and Surplus Evaluation Report*” prepared for Jordan Cove LNG L.P.

Exhibit 24: Dow Chemical Press Release Statement on U.S. Department of Energy Jordan Cove LNG Export Decision Midland, MI - 03/25/2014

Exhibit 25: Report prepared by Charles River Associates “*US Manufacturing and LNG Exports: Economic Contributions to the US Economy and Impacts on US Natural Gas Prices*” February 25, 2013

Exhibit 26: September 9, 2003 CRS Report for Congress titled, “*Liquefied Natural Gas (LNG) Infrastructure Security: Background and Issues for Congress*,” by Paul W. Parfomak, Specialist in Science and Technology Resources, Science, and Industry Division.
<http://www.au.af.mil/au/awc/awcgate/crs/rl32073.pdf>

Exhibit 27: “*Brittle Power, Energy Strategy for National Security*” 2001 Parts 1 – 3 (plus notes)
http://www.rmi.org/Knowledge-Center/Library/S82-03_BrittlePowerEnergyStrategy

Exhibit 28: January 15, 2016 Brattle Group Report: “*LNG and Renewable Power – Risk and Opportunity in a Changing World*”
http://www.brattle.com/system/publications/pdfs/000/005/249/original/LNG_and_Renewable_Power_-_Risk_and_Opportunity_in_a_Changing_World.pdf?1452804455

Exhibit 29: Report: *100% Clean and Renewable Wind, Water, and Sunlight (WWS) All-Sector Energy Roadmaps for 139 Countries of the World*; November 20, 2015

Exhibit 30: Oregon Roadmap for Transition to 100% wind, water, and solar (WWS) for all purposes (electricity, transportation, heating/cooling, industry)

Exhibit 31: The Australia Institute: “*Be careful of what you wish for - The economic impacts of Queensland’s unconventional gas experiment and the implications for Northern Territory policy makers*” November 2015