

June 22, 2019

Andrew Stamp, Coos County Hearings Officer
Andrew H. Stamp, P.C.
4248 Galewood Street
Lake Oswego, Or. 97035

RE: Coos County Remand File Number: REM-19-001

Dear Mr. Stamp:

I wish to provide the following written testimony for the above referenced matter in addition to my oral testimony taken at the Remand Hearing in Coquille on June 10th. During my oral testimony, you asked that I provide additional information regarding the USCG's approval (Formal Letter of Recommendation) on 5/11/18 for the Jordan Cove LNG Safety & Security Plan. Please see Exhibit A.

Much of the testimony received against this applicant and project has been repetitive. Likewise, I will avoid repeating in detail the same for benefits many supporters of the project focus upon: family wage jobs. This benefit is self-evident by simply examining the demographic statistics which reflect and haunt our rural communities. In particular, extremely high poverty levels, domestic violence, child abuse, drug addiction and high school drop-out rates all demonstrate that a lack of family wage job opportunities in Coos County do contribute to the formation and persistence of these issues. Obviously, the mere creation of more jobs will not solve these issues. But, it is also undeniable that increased job opportunities will certainly help reverse some of the negative demographic trends our region has suffered over the past three decades.

However, there are numerous public benefits that also deserve recognition. For instance:

Exhibit: 45
Date: 6/24/19



1. Enhanced mitigation plans such as the Kentuck Coho Restoration Project will exceed NOAA and ODFW expectations for reviving our threatened local wild run of Coho Salmon. This privately funded, \$60 Million project could very well result in this salmonid coming off the federal threatened species list (Exhibit B).

2. Funding the Community Enhancement Plan (CEP). Under agreement with Coos County, the Cities of Coos Bay, North Bend and the Oregon International Port of Coos Bay, Jordan Cove will make payments in lieu of property taxes that are projected to fund approximately \$500,000,000 during the construction phase and first 15 years of operations. These funds will benefit our schools via the South Coast Community Foundation; water front development & revitalization thru the Bayfront Investment Corporation; Coos County Government; SW Oregon Community College; International Port of Coos Bay; Southwest Oregon Regional Airport; Library Service District; North Bay Rural Fire Protection District and our 4H & Extension Service. All will reap significant financial benefits from the Community Enhancement Plan supported by this project. All citizens should realize that implementing the Community Enhancement Plan will generate tremendous public benefits for all Coos County Citizens.

3. Port modernization. The Oregon International Port of Coos Bay will directly benefit from shipping channel improvements supported by the project. These improvements will enable our Port and shippers along the lower bay to further develop and attract other water dependent industries to their own industrial properties. Therefore, channel improvements create a huge opportunity for the Port and our community to attract new industry and family wage jobs well in excess of those directly related to the Jordan Cove Energy Project. In addition, the ship calls generated by the project will increase the amount of cargo passing thru Coos Bay by 7.8 million tons each year. Federal funds for the maintenance of shipping channels & jetties are determined based on a port's annual tonnage. The addition of

7.8 million tons will help ensure Coos Bay's future viability as an international port. These public benefits are significant and we ask that you take them into consideration.

4. Western Rocky Mountain gas producers will gain access to world markets. According to visiting County Commissioners from Moffett, Mesa & Garfield Counties in Western Colorado, this opportunity, made possible via the Pacific Connector Gas Pipeline, will likely create hundreds of jobs in their rural areas and produce much needed tax revenue to help support vital community services.
5. The Pacific Connector Gas Pipeline serves our national security interests abroad by countering Chinese aggression in the South China Sea and will help reduce trade deficits with our Pacific Rim Allies.
6. We must all consider whether the world can meet its energy needs now or over the next 25 years without our nation and others exporting natural gas. Emphatically, the answer is NO, and here is why. Today, green energy (wind/solar) only generates 0.6% of the world's power needs. 25 years from now green energy will contribute around 3% of the globe's energy requirements (Dr. Lomborg, Copenhagen Consensus Center) (Exhibit C).

What is the world expected to do now or in 25 years for the other 97%? Although some advanced countries will do better, none will come close to generating the majority of their energy needs via green sources. Therefore, a diverse combination of energy sources will be needed for quite some time until technological innovation can supply greener and more cost effective solutions which don't punitively harm the poorest of the world's populace.

Natural gas is the clean & cost effective alternative energy source that has become the logical choice for global power generators & consumers concerned with air pollution (Exhibit D).

Green energy is incapable of exclusively supplying these needs now or anytime in the next 25 to 40 years. An informed person without ideological bias will make the same determination once they analyze the relevant statistics for themselves. Unfortunately, green energy proponents can't provide the road map to a green utopia absent crippling affects upon global living standards.

The rapid pace by which many third world countries are now developing LNG import facilities is a testament to their desire to replace dirtier energy sources such as coal and oil with natural gas (Exhibit E). A free flowing global marketplace for natural gas will enable the world to undertake an orderly transition towards increasingly higher uses of green energy over time while minimizing negative economic consequences. A robust domestic and world market for natural gas will create as many as 2 million jobs in the U.S. by 2040 (API). The Energy Information Administration predicts an additional \$1 billion in cost savings for American consumers from lower energy prices and cheaper production of petrochemical products. The Piceance Basin in Western Colorado will supply the project and holds 20 times the reserves previously known to exist. These are abundant resources we must share with the world. By doing so, we ensure a bright economic future for ourselves as well as for our allies around the globe. The Jordan Cove Energy Project and Pacific Connector Gas Pipeline will play a key role in achieving these goals for all concerned parties here and abroad.

As a property owner that will be inconvenienced by pipeline construction I do expect to be treated fairly and that impacts will be mitigated. Presently, 82% of property owners impacted by the pipeline's path have signed voluntary easement agreements and support the project (Exhibit F).

The overwhelming benefits accruing to our local, regional, national and global economies from developing this project and others like it, fare exceed any

temporary impacts upon landowners and users of the waterway. Our port once enjoyed 350+ ship calls per year. Now we are down to approximately 55 ship calls annually. Even with the increased shipping activity generated by this project, we will still fall well short of historic levels during the 1970's. I do recall we still enjoyed the abundant recreational and commercial fishing opportunities up, down and outside the bay during that historical period. LNG ship transit times are similar to the log and chip ships. The difference is a larger safety "halo" surrounding the tanker as it transits along the bay with a USCG escort.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Todd Goergen", with a long horizontal flourish extending to the right.

R Todd Goergen

PO Box 97

Coos Bay, Or. 97420

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

Exhibit "A"

COAST GUARD RELEASES JORDAN COVE LNG LETTER OF RECOMMENDATION

U.S. Coast Guard sent this bulletin at 05/11/2018 06:02 PM EDT



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

News Release

U.S. Coast Guard 13th District PA Detachment Astoria

Contact: Lt. Cmdr. Laura Springer

(503) 240-2594

(503) 209-2468

[PA Detachment Astoria online newsroom](#)

COAST GUARD RELEASES JORDAN COVE LNG LETTER OF RECOMMENDATION

PORTLAND, Ore. — The Coast Guard completed a review of the Waterway Suitability Assessment submitted by KSEAS Consulting on behalf of Jordan Cove LNG for the Jordan Cove Liquefied Natural Gas (LNG) Terminal Thursday May 11, 2018.

Based upon this review, the Captain of the Port Sector Columbia River recommended to the Federal Energy Regulatory Commission (FERC) that the waterway in its current state be considered suitable for LNG marine traffic associated with this project.

The specific measures and the resources needed are documented in a Letter of Recommendation submitted to the FERC.

The Coast Guard received official notification January 9, 2017, of the company's proposal to build an LNG terminal in Coos Bay. During the course of that time, Coast Guard Sector Columbia River personnel worked

with the applicant, state and local emergency response providers, as well as port and community stakeholders to assess the safety and security issues associated with LNG tankers traveling into Coos Bay.

“We continue working with local officials and the port community to ensure that every measure is taken to ensure the excellent safety record of the marine transport of LNG is continued if an LNG terminal is built in Coos Bay,” said Captain William Timmons, Coast Guard Captain of the Port, Sector Columbia River. “At this point, the waterway can accommodate the types of vessels associated with the proposed Jordan Cove LNG facility. We are working together to make sure that any resource issues are resolved through the Emergency Response Planning Process.”

The Coast Guard will continue working with the FERC on the development of an Environmental Impact Statement that addresses the effects of the proposed safety and security measures along the waterway.

FERC is responsible for authorizing the siting, construction, and operation of onshore LNG facilities. Once FERC completes their review of an application for an LNG facility it is required to complete an Environmental Impact Statement (EIS). In the EIS, FERC evaluates issues ranging from biological to socioeconomic and security impacts. The Coast Guard will serve as a cooperating agency for FERC’s Environmental Impact Statement.

If the facility is permitted by FERC, Jordan Cove LNG will be required to submit an Emergency Response Plan and Transit Management plans that identify the resources necessary to support the Waterways Suitability Analysis and facility operation. The applicant will also have to document its cost sharing arrangements with the affected communities for project related expenses.

-USCG-

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U.S. Department of
Homeland Security

United States
Coast Guard



Captain of the Port
U. S. Coast Guard
Sector Columbia River

2185 SE 12th Place
Warrenton, Oregon 97146-9693
Staff Symbol: s
Phone: (503) 861-6211

16611
May 10, 2018

Director of Gas Environment and Engineering, PJ 11
Attn: Mr. Rich McGuire
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Mr. McGuire:

This Letter of Recommendation (LOR) is issued pursuant to 33 Code of Federal Regulations (CFR) 127.009 in response to the Letter of Intent submitted by Jordan Cove Energy Project, L.P. (Jordan Cove) on January 9, 2017. Jordan Cove proposes to construct and operate the Jordan Cove LNG facility in Coos Bay, Oregon from which Liquefied Natural Gas (LNG) is proposed to be transferred in bulk to a vessel for export. This LOR conveys the Coast Guard's recommendation on the suitability of the Coos Bay Channel for LNG marine traffic as it relates to safety and security. In addition to meeting the requirements of 33 CFR 127.009, this LOR fulfills the Coast Guard's commitment for providing information to your agency under the Interagency Agreement signed in February 2004.

After reviewing the information in the applicant's Letter of Intent (LOI) and Waterway Suitability Assessment (WSA) with subsequent annual updates and completing an evaluation of the waterway in consultation with a variety of state and local port stakeholders, I recommend that the Coos Bay Channel be considered suitable for LNG marine traffic. My recommendation is based on review of the factors listed in 33 CFR 127.007 and 33 CFR 127.009. The reasons supporting my recommendation are outlined below.

On November 1, 2017, I completed a review of the WSA for the Jordan Cove Energy Project, submitted to the Coast Guard by KSEAS Consulting on behalf of Jordan Cove in February 2007. This review was conducted following the guidance provided in U.S. Coast Guard Navigation and Vessel Inspection Circular (NVIC) 01-2011, dated January 24, 2011. In conducting this review and analysis, I focused on the navigation safety and maritime security aspects of LNG vessel transits along the affected waterway. My analysis included an assessment of the risks posed by these transits and validation of the risk management measures proposed by the applicant in the WSA. During the review, I consulted a variety of stakeholders including the Area Maritime Security Committees, Harbor Safety Committees, State representatives, Pilot Organizations, and local emergency responders.

Based upon a comprehensive review of Jordan Cove's WSA, and after consultation with State and Local port stakeholders, I recommend that the Coos Bay Channel be considered suitable for accommodating the type and frequency of LNG marine traffic associated with this project.

The attached LOR Analysis contains a detailed summary of the WSA review process that has guided this recommendation. It documents the assumptions made during the analysis of Jordan Cove's WSA. It discusses details of potential vulnerabilities and operational safety and security measures that were analyzed during the review. The portion of the LOR Analysis which

addresses matters that affect maritime security is marked as Sensitive Security Information and is withheld from distribution.¹ The LOR Analysis sets forth the navigational safety and maritime security resource gaps that currently exist in, on, and adjacent to the waterway, including the marine transfer area of the proposed facility, and which, to the extent allowable under FERC's existing legal authority, may be addressed in its Commission Order if one is issued. To the extent implementation of specific mitigation measures fall outside the scope of FERC's legal authority, the applicant is expected to examine the feasibility of implementing such mitigation measures, in consultation with the Coast Guard and State and Local agencies as applicable.

This recommendation is provided to assist in the Commission's determination of whether the proposed facility should be authorized. This Letter of Recommendation is not an enforceable order, permit, or authorization that allows any party, including the applicant, to operate a facility or a vessel on the affected waterway. Similarly, it does not impose any legally enforceable obligations on any party to undertake any future action be it on the waterway or at the proposed facility. It does not authorize, nor in any way restrict, the possible future transit of properly certificated vessels on the Coos Bay Channel. As with all issues related to waterway safety and security, I will assess each vessel transit on a case by case basis to identify what, if any, safety and security measures are necessary to safeguard the public health and welfare, critical marine infrastructure and key resources, the port, the marine environment, and vessels. In the event the facility begins operation and LNG vessel transits commence, if matters arise concerning the safety or security of any aspect of the proposed operation, a Captain of the Port Order could be issued pursuant to my authority under the Ports and Waterways Safety Act of 1972, as amended by the Port and Tanker Safety Act of 1978, 33 U.S.C. § 1221 – 1232, among other authorities, to address those matters.

Please note that Enclosures (4) is Sensitive Security Information (SSI) and shall be disseminated, handled and safeguarded in accordance with 49 CFR Part 1520, "Protection of Sensitive Security Information."

If you have any questions on this recommendation, my point of contact is Lieutenant Commander Laura Springer. She can be reached at the address listed above, by phone at (503) 209-2468, or by email at Laura.M.Springer@uscg.mil.

Sincerely,



W. R. TIMMONS,
Captain, U. S. Coast Guard
Captain of the Port, Sector Columbia River

- Enclosure (1) LOR Analysis
(2) LOR issued by Sector Portland on April 24, 2009
(3) U.S.C.G.'s Waterway Suitability Report for the Jordan Cove Energy Project
(4) LOR Analysis (SSI Portion)

¹ Documents containing SSI may be made available upon certification that the requestor has a need to know and appropriate document handling and non-disclosure protocols have been established.

Copy: Commander, Coast Guard District Thirteen (dp)
Commander, Pacific Area (PAC-54)
Commandant (CG-OES), (CG-ODO), (CG-FAC), (CG-741), (CG-CVC), (CG-ENG),
(LNGNCOE)
Marine Safety Center (CG MSC)
Jordan Cove

Exhibit "B"



Investing in Oregon's Future

*Enhancing Estuary Habitat and
Restoring Oregon Coast Coho*



Our Commitment

We're investing in Oregon's future by restoring and rehabilitating 100 acres of critical Coos Bay coastal habitat.

From Caddies to Coho

The Jordan Cove Project's \$60 Million investment will create approximately 100 new acres of productive and diverse marsh and stream habitat where there was formerly an 18-hole golf course.

Critical new habitat for salmon

In addition to migratory waterfowl, raptors, and other wildlife species, this expanded marsh ecosystem will provide Oregon's

salmon with critical rearing and feeding habitat.

Supports coast-wide efforts

When coupled with other important Oregon Coastal Coho restoration efforts, this project will directly support Oregon's resolve to delist these fish from the Oregon Coastal Coho Salmon from the U.S. Fish & Wildlife Service's Endangered Species List.

The Vision for Coos Bay Estuary

Through our engagement with individuals and organizations committed to preserving and protecting Oregon's coast and coastal species, we've identified a unique opportunity to create a lasting, positive impact for generations to come.



Create approximately **100 acres** of new life-giving marsh and stream habitat



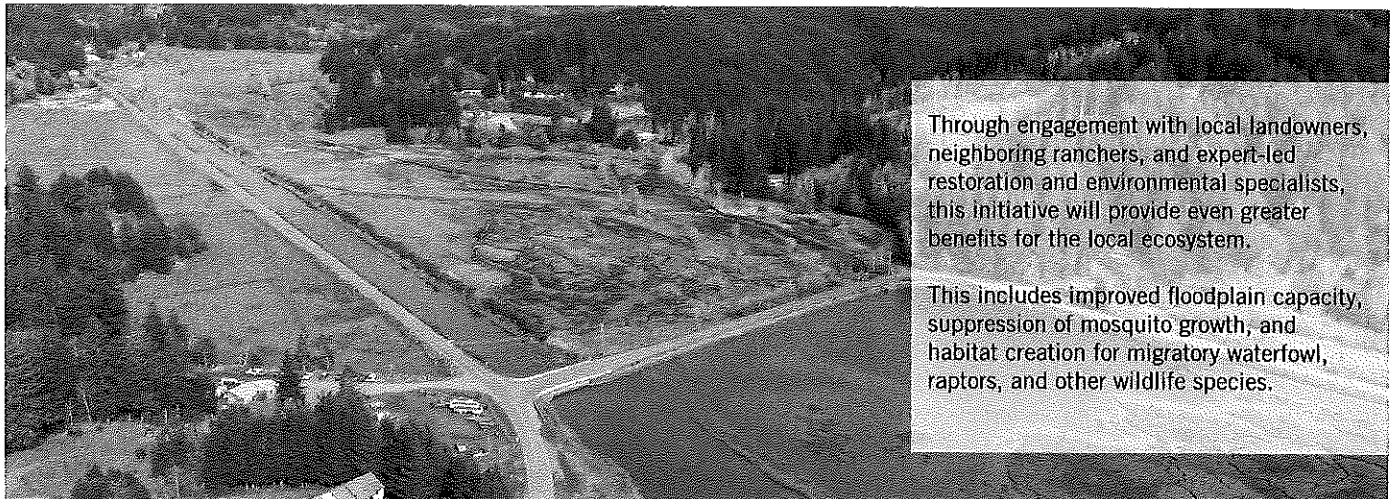
Reconnect two **historic salmon spawning streams** to the restoration site



Provide diverse & healthy **fisheries habitat** with over 58 new habitat features

- Convert former golf course fairways to high value salt and freshwater marsh and off-channel habitat.
- Improve bay water quality through marsh filtration.
- Produce a potential range of 11 to 17 additional returning adult Coho per restored acre; and from 180 to 270 additional Coho smolt per restored acre.
- Support the life cycle and restoration of Coho and Chinook Salmon, lamprey, steelhead and cutthroat.
- Build large wood fish houses and woody debris structures for salmon.
- Create new feeding ponds for juvenile salmon and provide resting areas for adults with protection from predators.

Pictured below is the proposed restoration area at Kentuck, located 5 miles from the Jordan Cove Project site, within the Coos Bay Estuary



Through engagement with local landowners, neighboring ranchers, and expert-led restoration and environmental specialists, this initiative will provide even greater benefits for the local ecosystem.

This includes improved floodplain capacity, suppression of mosquito growth, and habitat creation for migratory waterfowl, raptors, and other wildlife species.

Led by an award-winning team of environmental experts

We've partnered with David Evans Associates, WEST Consultants, Inc. and local Charleston/Coos Bay firm, River Docs LLC, to advise the design of the Kentuck Salmon Habitat Restoration Project.

David Evans Associates

Portland based David Evans Associates applies advanced designs, planning, and analysis to habitat restoration and protection, environmental permitting and compliance, floodplain and hydraulic analysis, wetland delineation and mitigation as well as a host of related service areas.

WEST Consultants, Inc.

WEST Consultants, Inc. specializes in advanced water resources investigations, working toward sustainable solutions that balance the needs of the users with those of the environment.

River Docs - The salmon habitat experts

Known for their unique dedication to Oregon's salmon, River Docs' staff have more than 130 years of combined experience in coastal habitat restoration.

Members of River Docs have been honored with the prestigious American Fisheries Society's North American Award for outstanding riparian work and management.

Meet some of the River Docs team

Cam Parry - Principal

Cam Parry is recent past chair of Oregon's internationally recognized Oregon Hatchery Research Center Board. In this role he worked with his colleagues on the board, OSU scientists, and ODFW to secure funding and direct research that protects wild salmon and develops new hatchery science.

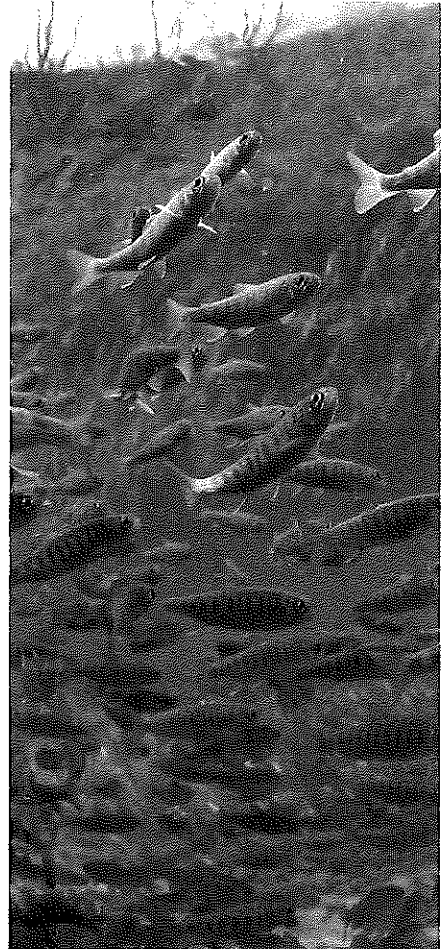
Cam has also received NOAA's Environmental Hero Award for his successful grassroots efforts to save a critical, functionally extinct run of wild Coho.

Kathleen Martin - Principal/Partner

Kathleen has contributed the last 20 years of her career supporting technology that uses live building systems to restore and enhance degraded riverine and estuarine habitat, re-creating a vibrant functioning ecosystem. She has managed projects in Oregon and California involving multiple public and private stakeholders all focused on restoration efforts that improve habitat for endangered salmonids.

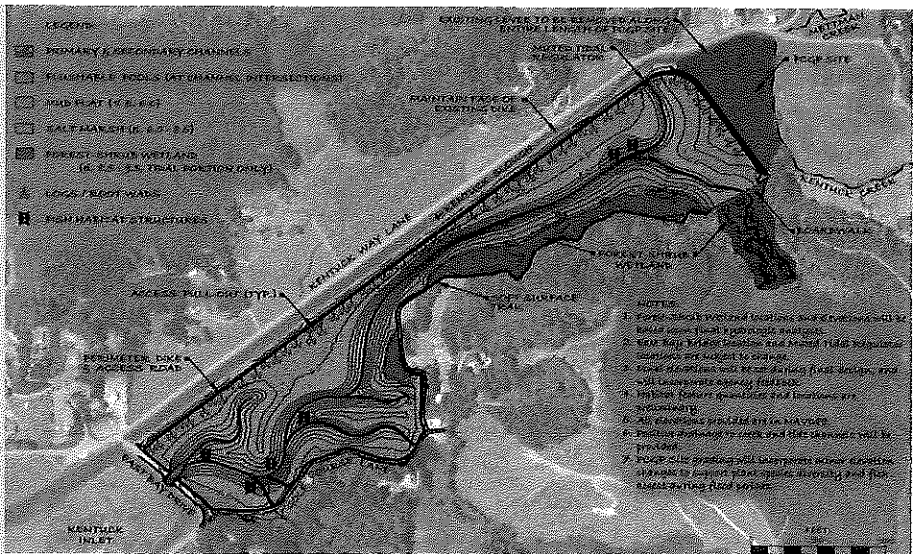
John Gardiner - Bioengineer

John Gardiner has been honored by Queen Elizabeth II with the British Order of the Empire for his outstanding contributions to the restoration of the Thames River and the creation of the Jubilee Channel.



"The Jordan Cove Project's 100-acre Salmon Habitat Restoration effort at the site of the old Kentuck golf course ultimately balances the highest level of fisheries and resource uplift with important community and stakeholder input. It supports and honors adjoining agriculture and timber interests, and respects and includes surrounding neighbors."

- Cam Parry, River Docs



This \$60 Million investment includes a new bridge along East Bay Drive, a restored Kentuck perimeter dike, a new Muted Tidal Regulator for full fish passage, and numerous new salmonid habitat elements.



River Docs explains the story of Oregon's pacific salmon

The Pacific Salmon

For five million years, Pacific Salmon species thrived as one of the healthiest species in the Pacific Northwest's rich and diverse ecosystem.

Salmon consistently returned to their habitats in such great numbers that few believed their species could falter. Like the American Buffalo, there seemed to be endless supplies of salmon and many never thought these species could be pushed to the brink of extinction.

Loss of Habitat

Early pioneers did not realize the impacts from draining salmon-rearing marshes as they sought to make the land more productive for their families. Splash dams that destroyed miles of riparian habitat simply were viewed as an easy way to get logs to mill.

Additionally, the impacts of vast canneries from Gold Beach to Astoria, coupled with the construction of great dams that took away countless miles of critical spawning habitat added to the toll on wild salmon populations.

Our Salmon Today

Today wild salmon runs are threatened or endangered across much of their historic range, but great hope remains for their restoration. Our newest fisheries science has shown us where focused restoration will have the greatest positive impact to bring back once formidable runs.

Of all the possibilities for restorable habitat on the Pacific Coast, Southern Oregon's coast remains the undeniable bright spot.

The Pembina Way

Pembina US Corp., the owner of the Jordan Cove Project is committed to responsible development in all areas of our business and one of our highest priorities is protection of the environment. As a responsible developer, Pembina strives to reduce the impact our projects and operations have on the natural environment.

We strive to design our projects to avoid impacts to the natural environment and develop environmental management programs to minimize any impacts that can't be completely avoided.

Thanks to our collaborators

We gratefully acknowledge the wonderful stakeholder design support and suggestions received as developed plans for the Kentuck Salmon Habitat Restoration project. These stakeholders include neighboring farmers and ranchers in the Kentuck Water Control District, the Oregon Department of Fish & Wildlife, the National Marine Fisheries Service, Nehalem Marine Manufacturing (and many more). Their valuable contributions to this effort are appreciated.

Contact us

The Jordan Cove Project values our connection with the community and all stakeholders.

General Inquiries

1-866-27-9249 (Toll-free)
welisten@jordancovelng.com

To learn more, visit:
www.jordancovelng.com

Jordan
Cove LNGSM
A Pembina Company

Exhibit "C"

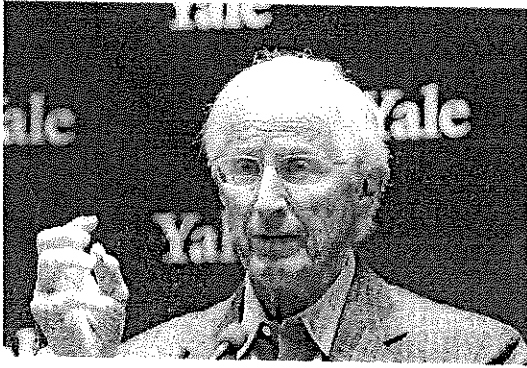
| COMMENTARY

U.N. Ignores Economics Of Climate

New Nobel laureate William Nordhaus says the costs of proposed CO2 cuts aren't worth it.

By Bjorn Lomborg

Oct. 9, 2018 6:51 p.m. ET



Yale professor William Nordhaus speaks in New Haven, Conn., Oct. 8. PHOTO: MICHELLE MCLOUGHLIN/REUTERS

The global economy must be transformed immediately to avoid catastrophic climate damage,

a new United Nations report declares. Climate economist William Nordhaus has been made a Nobel laureate. The events are being reported as two parts of the same story, but they reveal the contradictions inherent in climate policy—and why economics matters more than ever.

Limiting temperatures to 2.7 degrees Fahrenheit above preindustrial levels, as the U.N.'s Intergovernmental Panel on Climate Change urges, is economically and practically impossible—as Mr. Nordhaus's work shows. The IPCC report significantly underestimates the costs of getting to zero emissions. Fossil fuels provide cheap, efficient power, whereas green energy remains mostly uncompetitive. Switching to more expensive, less efficient technology slows development. In poor nations that means fewer people lifted out of poverty. In rich ones it means the most vulnerable are hit by higher energy bills.

The IPCC says carbon emissions need to peak right now and fall rapidly to avert catastrophe. Models actually reveal that to achieve the 2.7-degree goal the world must stop all fossil fuel use in less than four years. Yet the International Energy Agency estimates that in 2040 fossil fuels will still meet three-quarters of world energy needs, even if the Paris agreement is fully implemented. The U.N. body responsible for the accord estimates that if every country fulfills every pledge by 2030, CO2 emissions will be cut by 60 billion tons by 2030. That's less than 1% of what is needed to keep temperature rises below 2.7 degrees. And achieving even that fraction would be vastly expensive—reducing world-wide growth \$1 trillion to \$2 trillion each year by 2030.

The European Union promises to cut emissions 80% by 2050. With realistic assumptions about technology, and the optimistic assumption that the EU's climate policy is very well designed and coordinated, the average of seven leading peer-reviewed models finds EU annual costs will reach €2.9 trillion (\$3.3 trillion), more than twice what EU governments spend today on health, education, recreation, housing, environment, police and defense combined. In reality, it is likely

The new report has no comparison of the costs and benefits of climate targets. Mr. Nordhaus's most recent estimate, published in August, is that the "optimal" outcome with a moderate carbon tax is a rise of about 6.3 degrees Fahrenheit by the end of the century. Reducing temperature rises by more would result in higher costs than benefits, potentially causing the world a \$50 trillion loss.

It's past time to stop pushing so hard for carbon cuts before alternative energy sources are ready to take over. Instead the world must focus on resolving the technology deficit that makes switching away from fossil fuels so expensive. Genuine breakthroughs are required to drive down the future price of green energy.

Copenhagen Consensus analysis shows a ramped-up green-energy research-and-development budget of around \$100 billion a year would be the most effective global-warming policy. It would be much cheaper than the approach pushed by the IPCC, and would not require global consensus. Most important, it would have a much better chance of ameliorating temperature rises. Under the IPCC's approach, by contrast, the costs would vastly outweigh the benefits. Instead, the over-the-top reception to the latest IPCC report means that we are more likely to continue down a pathway where the costs would vastly outweigh the benefits.

Mr. Lomborg is president of the Copenhagen Consensus Center and author of "The Skeptical Environmentalist" and "Cool It."

Appeared in the October 10, 2018, print edition.

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Exhibit D

Committed to addressing the country's severe air pollution, China is attempting a shift from coal to natural gas and is considering a variety of sources, including domestic and imported gas options as well as creating its own synthetic gas from coal.

A team of researchers led by Princeton University investigated the environmental impacts of transitioning from coal to natural gas in China, exploring implications on air quality, carbon mitigation and water stress by the year 2020.

The findings, published in *Nature Sustainability*, warn that the use of coal-based synthetic natural gas, known by the acronym "SNG," would increase carbon emissions and water demand, especially in regions in China that already have high per capita carbon emissions and water scarcity.

Overall, the researchers find that a switch from coal to other natural gas types does produce air, carbon and water co-benefits when methane leakage, a powerful greenhouse gas, is well controlled. However, there are trade-offs when it comes to degree of improvements for air quality and water scarcity — depending on which sector the natural gas is used to substitute for coal and where that substitution takes place.

The paper is among the first to analyze the interconnections between air quality, carbon emissions and water use in both energy production and consumption. The paper highlights the need for an integrated, strategic approach when reshaping energy systems.

"Assessing air quality, carbon emissions and water scarcity impacts across local, regional and global levels is crucial to capturing potential co-benefits while avoiding unintended consequences," said study first author Yue Qin, who conducted the research as a doctoral candidate at Princeton. She is now a postdoctoral scholar at the University of California-Irvine.

"Although there is a lot of discussion on the need for a clean energy supply transition, in what sector the clean energy is used and what it is displacing is also critical in determining air quality, carbon and water co-benefits."

Study co-authors included Wei Peng, who conducted the research at Princeton and is now at Harvard University; Lena Höglund-Isaksson, Edward Byers and Fabian Wagner, all from the International Institute for Applied Systems Analysis; and Kuishuang Feng, based at the University of Maryland.

The researchers set out to analyze the relationship between the energy industry and its effects on air quality, carbon and water. These environmental issues are frequently addressed individually, but the energy sector affects each of these areas in distinct ways and energy policies can either bring co-benefits or disbenefits.

China became the case study because of its plans to reduce its dependence on coal and transition, in part, to natural gas as a way to improve air quality. The authors were interested in the broader environmental implications of this move, which has global implications for sustainable development.

Today, China accounts for more than half of the world's coal consumption. Natural gas — the cleanest fossil fuel — accounts for only 6 percent of China's primary energy consumption, against a global average of approximately 10 percent. The global average has been steadily rising about 1.8 percent every year since 2000.

To understand the environmental impacts of a coal-to-natural-gas switch, the researchers combined an energy production use lifecycle analysis, which charts a product's life from start to finish, with an integrated environmental impact assessment.

For each of six major gas sources, they examined the impacts of substituting coal with a fixed amount of additional natural gas on resulting air quality improvements, carbon mitigation and water stress across China.

The gas sources were chosen based on government and industrial plans for 2020 and included conventional gas, synthetic natural gas, shale gas, imported liquefied natural gas, imported Eastern Russia gas and imported Central Asia gas.

The researchers identified air, carbon and water as their "environmental targets" because of the global and national interest in these areas. Also, the simultaneous examination of these three areas could help avoid severe, unintended environmental consequences.

The researchers found that, except for coal-based synthetic natural gas, replacing coal with natural gas generally has benefits for air quality, carbon mitigation and water stress.


cubic meters of gas for coal.

But coal-based synthetic natural gas is another story. Synthetic natural gas increases carbon emissions and water consumption in China's northwestern provinces, which already suffer from high per capita carbon emissions and severe water scarcity.

"Importantly, as the regions with high air pollution do not overlap with regions with high water stress, and substitution in different sectors bring different levels of air quality and water impacts, there are trade-offs in the magnitude of air quality and water improvements," Qin said.

Overall, the gas source affects air quality, carbon and water in different ways depending on how it's used.

"Our findings show *why* it is critical to understand the underlying air-carbon-water synergies and trade-offs so that China, as well as other developing countries, can properly design clean energy transition pathways according to their local environmental priorities," Qin said.

 "The development of new energy systems provides an opportunity to simultaneously reduce multiple environmental impacts including domestic air pollution, local water scarcity and global climate change," Mauzerall said. "Ultimately, a full transition away from carbon-based fuels will be necessary to address climate change. In other research we have found that renewable energy provides the largest co-benefits for air quality, carbon mitigation and reduced water consumption of any known energy sources."

Qin thanks the Woodrow Wilson School at Princeton University for her graduate fellowship as well as the International Institute for Applied Systems Analysis for her 2016 Young Scientists Summer Program fellowship.

The paper, "Air Quality-Carbon-Water Synergies and Trade-offs in China's Natural Gas Industry," appears Sept. 14 in *Nature Sustainability*.

B. Rose Kelly

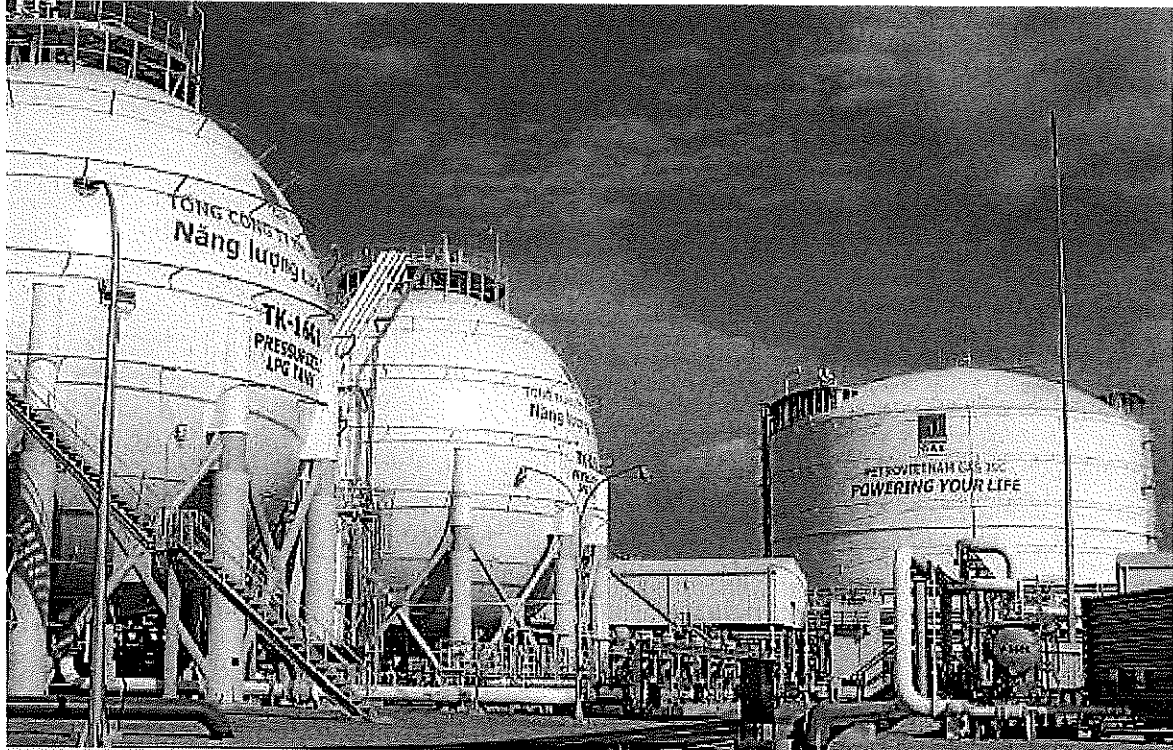
B. Rose Kelly is with the Woodrow Wilson School of Public and International Affairs, Princeton University.

Vietnam Investment Review

Vietnam will import LNG

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Vietnam's gas supply is forecast to fall short of demand between 2017 and 2035, due to the decline of the country's gas reserves and the delayed development of new power plants under the Power Development Plan VII, therefore, which makes it necessary to develop new gas sources, build infrastructure to develop marginal gas fields or even import liquefied natural gas (LNG).



Vietnam will import LNG

LNG is becoming a trend in Southeast Asia. Thailand was the first Southeast Asian country to import LNG fuel in 2011, reaching 3.95 million tonnes in 2017, up 30 per cent from the previous year. Malaysia's LNG imports increased by 40 per cent to 1.8 million tonnes. Indonesia and the Philippines, which used to be LNG exporters, will begin importing from the early 2020s, according to *Nikkei*.

Nguyen The Huu, director of the Electricity Regulatory Authority of Vietnam (ERVAV) under the Ministry of Industry and Trade (MoIT), also stated at the Vietnam Wind Power 2019 conference that Vietnam might need to import LNG to meet its increasing energy demand in the near future.

Electricity demand in Vietnam has been increasing by about 10 per cent per year, putting great pressure on the electricity industry to ensure a stable supply for economic development and people's living.

The proportion of electricity consumption by industries has increased. Before 2010, about 50 per cent of electricity consumption was for residential activities and 30 per cent for the industry.

However, at present, 50 per cent of the electricity output is reserved for industry and 30 per cent for residential use. This shows that electricity is majorly used for production and economic activities.

The proportion of hydropower in the previous years was a major part of the energy mix, but this proportion has not increased in recent years.

In Vietnam, according to Vu Dao Minh from the Oil and Gas Exploitation Department of Vietnam National Oil and Gas Group (PetroVietnam), the domestic gas output is about 10 billion cubic metres a year and this is expected to be maintained until 2020. However, from 2020 onwards, existing gas reserves will decline, affecting the country's ability to ensure gas supply for consumers.

In addition to declining gas production, the development of new gas fields faces difficulties such as high levels of impurities (CO₂, H₂S), reserves at deep water locations, offshore, or at sensitive areas. These factors affect the cost of exploitation, collection, and processing, as well as affect the price of gas.

Vietnam will import LNG

According to forecasts of imported LNG, the southeast region will start importing LNG from 2020, with an output of about 0.6 million tonnes and increasing by about 1 million tonnes when Nhon Trach 3 and 4 power plants go into operation.

After 2025, the demand for importing LNG will increase sharply to 5 million tonnes per year in 2025, 11 million tonnes in 2030, and 13.9 million tonnes in 2035.

The Northern region will also start to import LNG from 2025 onwards to supply gas for consumers in Thai Binh and neighbouring areas in the north.

According to *Nikkei Asian Review*, Vietnam National Petroleum Group (Petrolimex) revealed plans to build the first LNG import station with PetroVietnam to diversify energy sources as well as combat electricity shortages in Vietnam.

Currently, Petrolimex will focus on building an LNG storage station in Khanh Hoa province. Recipient facilities will sit next to a petroleum depot. LNG will be supplied to a gas-powered power plant built nearby by Electricity of Vietnam (EVN).

The plant is expected to begin operation in the late 2020s and will provide about 6,000MW of energy. However, the total investment, including storage and power plants, will cost about \$3.6 billion.

Tan Duong

Article's Link: <https://www.vir.com.vn/vietnam-will-import-lng-68486.html>

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Exhibit 'F'

THE WORLD

SOUTH COAST

SATURDAY, JUNE 22, 2019 | A3

JCEP claims 82% of impacted landowners support

NICHOLAS A. JOHNSON
The World

COOS BAY — In an exclusive release to The World newspaper, Jordan Cove announced it has secured 82 percent of easements with landowners along its proposed pipeline route.

These easements, voluntarily signed by property owners along the pipeline route, allow Jordan Cove to run its proposed pipeline underneath those properties with the permission of the landowner.

"This 82% is more than just a number. It represents a tremendous measure of progress forward for Jordan Cove," said Harry Andersen, Senior Vice President for Pembina Pipeline Corporation, the parent company of Jordan Cove. "This achievement reflects that a vast majority of the most impacted residents in southern Oregon are onboard with the Project and will help to make it a reality."

When Pembina became owner of Jordan Cove in 2017, the Proj-

ect had secured voluntary easement agreements with only 20% of landowners along the pipeline route. According to Pembina, in a little over a year's time the company has been able to negotiate land use approval with four times the amount of property owners then when it purchased the LNG project.

This announcement comes just before next week's Federal Energy Regulatory Commission hearings in each of the four Southern Or-

regon Counties that would be affected by the project.

With apparent opposition for the LNG project throughout Southern Oregon, Pembina claims that these numbers regarding impacted landowners suggest there is a large number of quiet supporters of the LNG terminal project.

Last October, Pembina launched an incentive program for impacted land owners offering a \$30,000 dollar pre-approval incentive payment. Originally the program

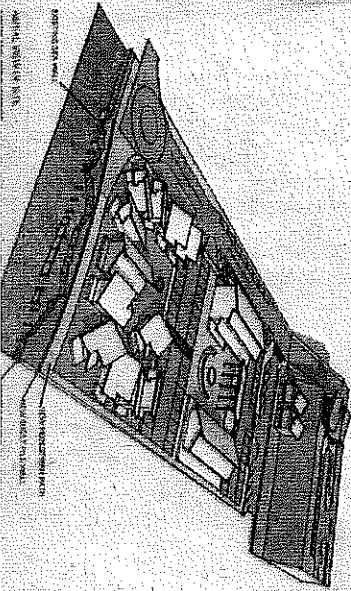
was scheduled to last through December of 2018, but was extended to March of 2019.

"We value the conversations we have had with landowners about the Project and the trust they put in us to be thoughtful stewards of something as important as their family's land," said Andersen.

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New law: Farmers, ranchers have immunity in fire fights

SALEM (AP) — A law passed by the Oregon Legislature gives farmers and ranchers immunity from liability while fighting dan-



AP Photo/Chris Wedel