

# Western States and Tribal Nations 2021

Summary of Findings of Report on Potential Emissions Reductions in Asia



### Content

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## Emissions Reductions Report 2021

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### Report Introduction

"Asia's energy demand is soaring, led by economic growth and fuel switching in China, Japan, South Korea, Taiwan and India. Natural gas from the Rockies basins can play a key role in meeting those energy needs, providing reliable, cleaner baseload power to displace dirtier fuels and foster renewable energy deployment..."



### Report Overview

Asia's energy demand is soaring, led by economic growth and fuel switching in China, Japan, South Korea, Taiwan and India. Natural gas from the Rockies basins can play a key role in meeting those energy needs, providing reliable, cleaner baseload power to displace dirtier fuels and foster renewable energy deployment by balancing intermittency issues and supporting the related supply chains.

China and India are using more natural gas for power generation to meet the demands of their growing populations and economies. These countries are also leveraging natural gas as a powerful tool to decrease their greenhouse gas emissions. In fact, Asian markets are expected to drive about threequarters of the world's liquefied natural gas (LNG) demand growth through 2040, roughly doubling with a combined annual growth rate of 4 percent, according to Shell's 2021 LNG Report.

To better understand how the Rockies basins can help solve the overall energy/LNG geopolitical and climate change challenges, Western States and Tribal Nations (WSTN) peer-reviewed expanded the "Country-Level Life Cycle Assessment of Greenhouse Gas Emissions from Liquefied Natural Gas Trade for Electricity Generation" study released by the University of Calgary, Johns Hopkins, the Massachusetts Institute of Technology and Southern Methodist University in 2018.

This refreshed study, entitled "Life Cycle Assessment of Greenhouse Gas Emissions from Liquefied Natural Gas Exports from North America's West Coast for Coal-Displaced Electricity Generation in Asia," examines the global emissions-saving potential of LNG sourced from 10 western basins, with a focus on the Green River, Uinta, Piceance and San Juan basins spanning Utah, Wyoming, Colorado and New Mexico.

This new study, by the lead author of the original study and the University of Utah, finds that LNG exported from the North American West Coast to China, India, Japan, South Korea, and Taiwan would reduce **net life cycle emissions reductions of between 42%-55%** if used to replace coal-fired energy generation in those countries.

Crucially, the report accounts for the life cycle greenhouse gas emissions impact of Rockies-sourced gas by assessing every point of the entire LNG supply chain, starting with production at the well head and ending with the emissions from electricity transmission and distribution in China, India, South Korea, Japan and Taiwan.

Findings are based on exports of 22.8 Metric Tons Per Annum (MTPA), the total planned export capacity of Sempra Energy's Costa Azul terminal near Enseñada, Mexico, and the proposed Jordan Cove, Oregon, terminal.

## **About Rockies Basins Resources**

#### Recoverable Resources

Potential Gas Committee estimates recoverable resources for the Rocky Mountain region are 437.1 trillion cubic feet.

#### Natural Gas Exports

Rockies natural gas exported from the west coast of North America reduces technical and geopolitical risk to supply our Far Eastern allies and other key Asian markets.

#### Panama Canal

West Coast LNG facilities would not require the use of the Panama Canal, a political risk as well as a shipping bottleneck and economic drag on overall LNG export costs for customers.

## Report Summary of Findings

### A Baseline for the Future

This updated comprehensive life cycle analysis provides a clear competitive advantage of how Rockies gas could reduce global emissions if exported to Asia to displace coal-fired electricity generation. The data provides the concrete building blocks needed to develop a pathway that elevates Rockies gas into the global Environmental, Social and Governance (ESG) gold standard for LNG, which would provide a comparative advantage over gas from international competitors such as Russia and Qatar.

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#### 01. Net Life Cycle

Net life cycle per unit reductions of 42%-55% would remain intact as LNG exports to the five nations double

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02. LNG Exports

Country-level data to show where LNG exports that displace coal generation would have the highest impact



#### 03. MTPA Exports

U.S. allies South Korea and Japan could reduce their coal emissions by 33.3% and 24.1% respectively if all 22 MTPA of exports were sent to either nation.



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Baseline % Change in Import Country's Life Cycle Emissions Factor After Displacement, Based on Life Cycle Emissions Factors of Local Coal and Imported U.S. West Coast LNG Electricity Generation (%)



### % of Import Country's Coal Electricity Generation (2018) That Could Be Displaced



Note: These charts were created from data contained in Exhibit 6.1 of the Full Report. The full exhibit may be found on page 13 of this document.

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## Report Summary of Findings (Continued)

### Other findings include:

1) Net life cycle per unit reductions of 42%-55% would remain intact as LNG exports to the five nations double, thereby removing more coal associated emissions with each incremental unit of coal displaced by LNG.

2) Country-level data shows where LNG exports that displace coal generation would have the highest impact, which arms policymakers and commercial decision-makers with additional information to inform export choices on diplomatic and economic levels.

a. For example, U.S. allies South Korea and Japan could reduce their coal emissions by 33.3% and 24.1% respectively if all 22 MTPA of exports were sent to either nation. b. South Korea and Japan could reduce emissions by 54.8% and 52.1% respectively on the same basis.

3) China and India, as the largest emitters generation with substantial coal footprints, absolute coal emissions reductions would be smaller based the on same export levels. However, both share the potential for a substantial life cycle emissions decreases - 42.0% for China and 49.8% for India

a. LNG exports to China would produce the lowest absolute emissions reduction, because of the small displacement factor when compared to coal. This reflects China's status as the world's largest emitter and its enormous reliance on coal for generation – 58% of its total energy consumption, according to the <u>Energy</u> <u>Information Administration</u>.

b. Therefore, only 3.3% of China's coalfired generation could be replaced for an overall emissions reduction of 1.4% or 71.4 MT CO2e/year. An increase in U.S. exports there would produce a correspondingly larger reduction.

c. India's reduction of coal-fired generation emissions would be 13.5% with a corresponding emissions reduction of 6.7%, based on the same export levels. Again, an increase in U.S. exports there would create a larger reduction while maintaining the life cycle gains. Forty-five percent of India's total energy consumption is fueled by coal, according to the EIA.

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This updated study presents hard data against which future technological and operational improvements can be planned and demonstrably measured. Operators throughout the supply chain can develop science-based strategies to reduce their emissions footprint further into the future, such as capturing fugitive emissions or examining carbon sequestration and other options that can use the same infrastructure such as blue hydrogen.

### Implications for the future



# Development of a plan that leverages existing U.S. infrastructure is critical.

As the U.S. Congress considers legislation that envisions transitioning energy workers from oil and gas into other energy industries – particularly in areas where a loss of oil and gas production would increase economic distress – the development of a long-term plan that leverages existing U.S. infrastructure and resources while creating new domestic production opportunities is critical.

The new study endeavors to provide Congressional lawmakers and the Biden Administration with baseline data that can inform a range of policy and political decisions that would advantage the U.S. on the global stage, generate economic development with lower global emissions, and increase government revenue that will benefit our states, as well as rural and sovereign tribal economies.

For all of the Rockies basins, the current open-ended moratorium on new drilling permits on federal lands risks the health of the oil and gas industry, and the economic health of the rural communities and tribal nations that benefit from energy production. As the Biden Administration develops its future federal leasing policy, considering the data this study provides can offer other viable opportunities to advance global environmental improvement while helping the U.S. chart its future energy path with existing resources that can be engineered for the low-carbon future.

The Rockies basins all offer the potential to develop blue

hydrogen (produced with natural gas), while the production cost of green hydrogen remains uneconomical and in early market testing stages. A forward-thinking domestic approach toward LNG and all forms of hydrogen can address economic challenges at home while increasing American strength on the global stage and utilizing existing gas infrastructure in beneficial new ways.

As buyers and investors demand more environmentally responsible fuels from producers and nations make greater climate commitments, the geopolitical value of Americanproduced energy can be increasingly positioned as the gold standard. Moreover, it can be utilized as a potent instrument of foreign policy. U.S. energy resources - produced to the highest ESG standards - can remain an element of American diplomatic strength lying somewhere between the soft power of leadership by example and the hard power expressed by military and economic might. This study is intended to be a rigorous baseline on which these policies can be developed. LNG sales on a long-term basis can ensure mutually prosperous relationships with allies that are net-positive to bilateral environmental goals, while countering Chinese influence being expanded across the Indo-Pacific through its Belt and Road Initiative, and sharing the U.S. experience of reducing emissions on an absolute basis for two decades in large part due to the replacement of coal with natural gas for energy generation.

## Report About the Study



Produced under the stewardship of the Western States and Tribal Nations Natural Gas Initiative and the Utah School and Institutional Trust Lands Administration, the study builds on earlier work examining the global greenhouse gas savings potential of LNG exports.

The report adds to <u>existing scholarship</u> from the University of Calgary, Massachusetts Institute of Technology, Southern Methodist University and Johns Hopkins University, as well as a 2014 U.S. National Energy Technology Laboratory report <u>updated in 2019</u>. WSTN contracted the lead author of the University of Calgary report to include additional analysis pertinent to natural gas produced in the U.S. western Rockies region and positioned for export on the west coast of the United States and Mexico.





### Study sponsors include:

- Ute Indian Tribe
- United Brotherhood of Carpenters
- LiUNA/Colorado Laborers
- Duchesne County, UT
- Uintah County, UT
- Utah School and Institutional Trust Land (SITLA)
- Utah Governor's Office of Energy Development
- Four Corners Innovation
- Four Corners Economic Development
- Wyoming Energy Authority

### **Excerpted from the Full Report:**

Exhibit 6-1: Change in GHG Emissions Resulting from Export of 22.8 MTPA of USWC LNG to Displace Coal Electricity in Different Import Countries

	Quantity of Coal Electricity that can be	% of Import Country's Coal Electricity	Change in Import Country's Coal Emissions Factor after	% Difference in Coal Emissions after	Baseline % Change in Import Country's Life Cycle Emissions Factor after	Difference in Coal Electricity Emissions after Coal Electricity Displacement (MT CO2-e/yr)
China	157	3.3	-15	-1.4	-42.0	-71.4
Taiwan	131	119.4	-370	-37.0	-44.0	-48.6
India	157	13.5	-86	-6.7	-49.8	-99.9
Japan	157	46.3	-315	-24.1	-52.1	-106.6
S. Korea	157	60.7	-463	-33.3	-54.8	-119.6

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## Western States and Tribal Nations 2021

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