Jordan Cove LNG

Uniquely Positioned to Provide Rocky Mountain Natural Gas to the growing Asian Pacific Market

Briefing to the Colorado Senate Select Committee on Energy and the Environment

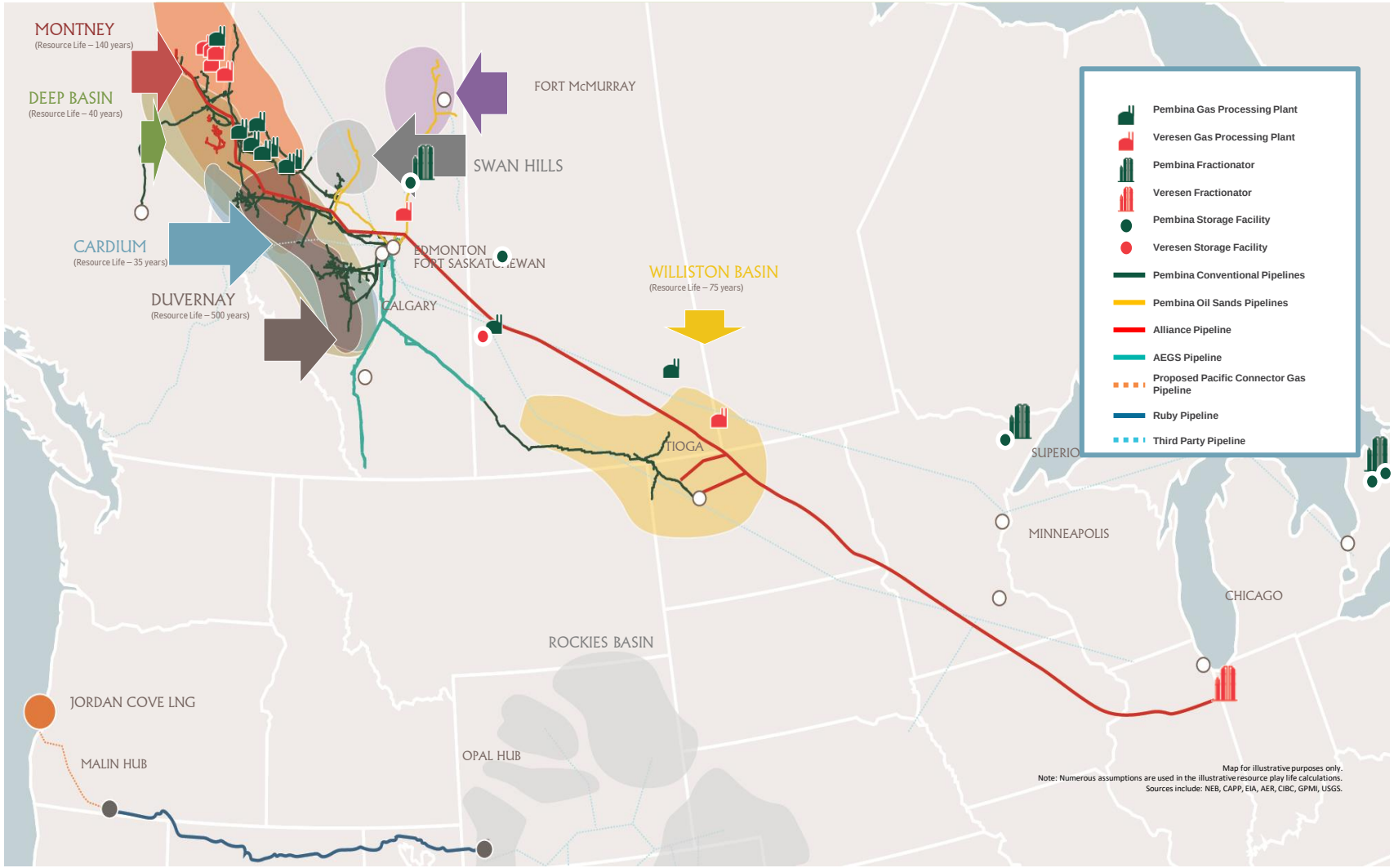
March 15, 2018

Jordan Cove LNG℠

PEMBINA

Pembina Pipeline Corporation

Pembina: fully-integrated midstream company with diversified asset portfolio along crude oil, condensate, NGL and gas value chains



US shareholders own 41% of the combined company

Pembina and Veresen

Pembina Pipeline Corporation acquired Veresen on October 2, 2017 and has maintained strong support for the Jordan Cove LNG project. The project forms the basis for a new U.S. based LNG business unit lead by the current project management.

We want our stakeholders to view us as the leader in the North American energy infrastructure sector

Our "Stand":

1. Ensure no harm to people or the environment
2. We are the "first choice" by customers to cost effectively and reliably connect them to markets
3. We provide sustainable industry-leading returns to our shareholders
4. We have a trustworthy, respectful, collaborative and fair work culture making us the "employer of choice"
5. We set the standard for harmonious relationships with all of our stakeholders

What is LNG and why is it Important?

Physical Properties of Liquefied Natural Gas

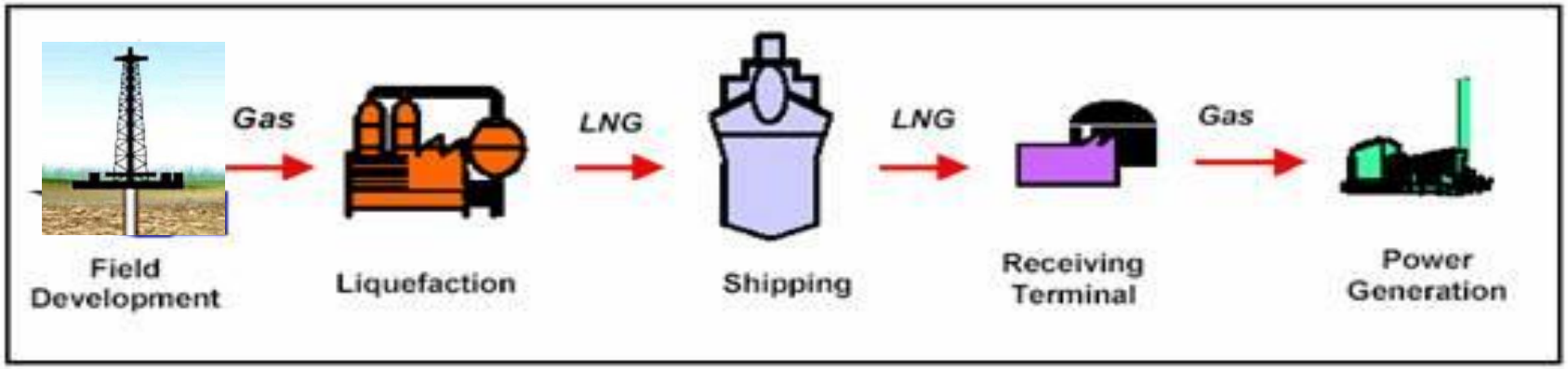
Natural gas becomes liquid natural gas (LNG) when cooled to -260 ° F (-160 ° C)

LNG takes up about 1/600th the volume of natural gas

LNG is slightly less than half the density of water (3.5-4.0 lbs./U.S. gal) and will therefore float if spilled on water.

One gallon of LNG contains approximately 70% of the energy content of gasoline

LNG is odorless, colorless, non-corrosive, non-toxic and non-flammable



MEMBRANE TYPE LNG CARRIER
Capacity 170,000 m3 of LNG = 3.6 BCF

Project Overview

Jordan Cove LNG – has two components

Jordan Cove LNG Terminal -Located in Coos Bay, Oregon, liquifies natural gas, stores the LNG then loads ships for transport to customers in Asia

- Converts approximately 1.2 BCFD of natural gas
- Produces 7.8 million tons per annum (mtpa) to LNG
- Load between 110 - 120 ships per year
- Ships make 7-mile USCG escorted transit from Port of Coos Bay site to Pacific Ocean

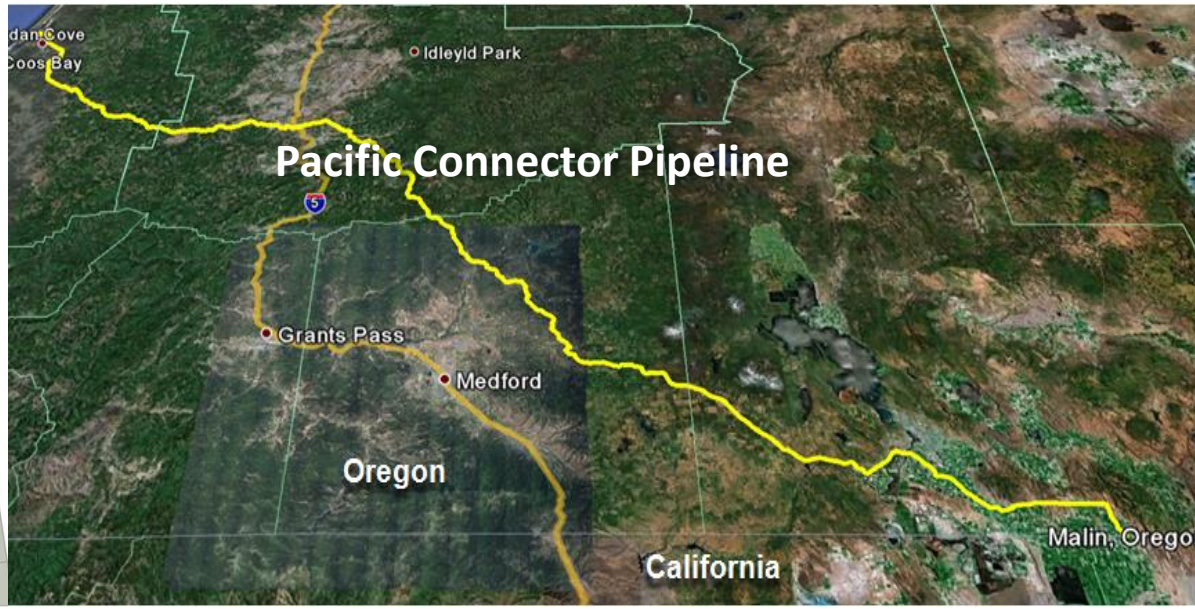
Rendering of the Jordan Cove LNG terminal looking to the Southwest, toward the Pacific Ocean.

Pacific Connector Gas Pipeline

Pacific Connector Gas Pipeline (PCGP) takes U.S. Rockies gas to Jordan Cove LNG Terminal in Coos Bay, Oregon

- 229 mile; 36” diameter, 1,600 psi natural gas pipeline
- Initial design capacity of approximately 1.2 BCFD, expandable
- Interconnected to Ruby and GTN pipelines at Malin Hub

California/Nevada Markets



Ruby Pipeline –
The Infrastructure linking Jordan Cove to Colorado

- 50% owned by Pembina
- $3.7 billion investment placed into service in 2011 to deliver Rocky Mountain natural gas into California
- 680 miles length, 42” diameter – capacity of 1.5 BCFD to the Malin Hub
- At Malin interconnections to PG&E, Tuscarora and soon to the Pacific Connector Gas Pipeline that will supply the Jordan Cove LNG terminal

KBJ – a quality joint venture

The LNG terminal will be built by a team of experienced contractors. After a competitive dual FEED, the EPC contract was awarded to KBJ on July 5, 2017.

Kiewit

Experienced in project execution and construction on multiple LNG projects:

- Cove Point LNG export terminal
- Canaport LNG import terminal
- Wheatstone LNG
- Elba Island LNG Expansion

BLACK & VEATCH

Leading global engineering, consulting, and construction company

Active in LNG projects since the early 1950's

PRICO process currently used in over 30 liquefaction units around the world

JGC

JGC is responsible for 30% of the world's LNG projects to date – 31 trains & yearly output of 90.7 million tons of LNG

Partnered with other EPC firms on complex modular LNG facilities

Engineering centers in Yokohama and Houston

Worldwide procurement capabilities

Oregon's Largest Privately Funded Industrial Project

Jordan Cove's contractor has executed project labor agreements with the Oregon Building and Construction Trades Council, and the Pacific Northwest Council of Carpenters for the terminal's construction.

Jordan Cove is committed to using union labor for construction of the pipeline. These are skilled jobs that pay an average of $80,000/yr. + benefits.

Terminal construction

- 53-month construction period
- 2,000 jobs at-peak; average of 1,000

Pipeline construction

- 24-month construction period
- 4,000 jobs at-peak; average of 1,400

Direct Permanent Employment

The Jordan Cove project will employ a total of 220 direct permanent employees with an average wage of $75,000/yr. + benefits:

Operating entity	Location	Number of jobs	
Terminal operations			
Operations	Coos Bay		180
Company office	Portland	20	
Pipeline operations			
Terminal operations	Coos Bay		6
Compressor station	Malin	4	
Pipeline office	Medford	10	
Total		220	

Economic Impact

Total project cost:	**$9.8 billion**
Annual Oregon Corporate tax:	**$48 million**
Annual taxes and payments to Oregon local governments:	**$60 million**
Total annual taxes and payments in Oregon:	**$108 million**

County breakdown of local taxes

Property Tax by District Type and Community Enhancement Plan	Coos	Douglas	Jackson	Klamath	4 County Total
Property Taxes:					
County government	$634,853	$691,673	$1,141,872	$1,346,605	$3,815,002
Public safety, fire, and hospitals	455,559	170,378	254,704	616,035	1,496,676
Local K-12 schools and ESDs	2,525,525	3,471,416	3,277,518	2,559,274	11,833,732
Community colleges	337,297	282,974	351,196	237,596	1,209,063
Libraries	350,400	-	272,936	282,784	906,120
Other local districts	353,687	37,307	47,764	300,647	739,405
Property Tax Subtotal	$4,657,322	$4,653,748	$5,345,989	$5,342,941	$20,000,000
Community Enhancement Plan	40,000,000	-	-	-	40,000,000
Total Payments	$44,657,322	$4,653,748	$5,345,989	$5,342,941	$60,000,000

Sources: JCLNG and ECONorthwest analysis of 2016/17 tax code area data from county assessors.

Commercial Update & Permitting Update

Commercial Status – Terminal & Pipeline

- **Of Japan's long term LNG supplies, 25% expire between 2020 and 2025**
- **Jordan Cove has reached commercial agreement with two major Japanese LNG companies and is progressing commercial discussions with others**

  - JERA – liquefaction capacity of 1.5+ million tones per annum (mtpa)
    - Exclusive fuel procurement company for Japan's largest electric utilities
    - Single largest LNG buyer in the world; they make the market
  - ITOCHU – liquefaction capacity of 1.5 mtpa
    - Largest Japanese trading company in 2016
    - Long history in the global LNG trade
  - Discussions continue with a number of other potential Asian buyers for the remaining liquefaction and pipeline capacity

What drives Asian buyers to purchase LNG from North America and specifically Jordan Cove?

For Japan it was the events of March 11, 2011

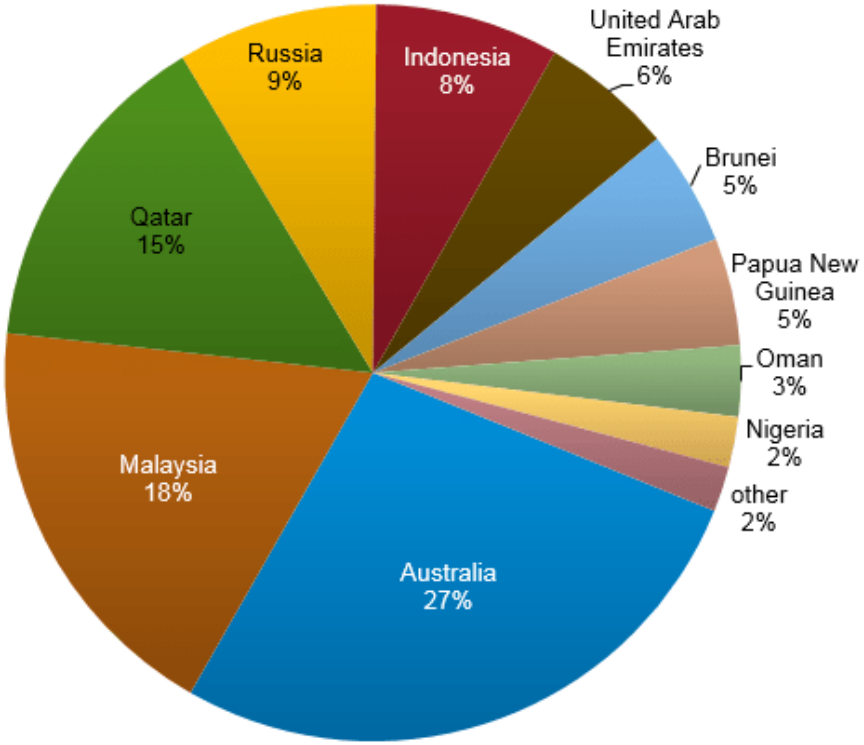
Prior to the Tohoku Earthquake Japan had 54 operating nuclear power plants that generated 29% of the nations electricity with a goal of increasing to 40%, today nuclear accounts for less than 3% of the nations needs, with 43 nuclear plants idle.

TEPCO Futtsu LNG Receiving Terminal, Tokyo Bay including 5,050 MW Natural Gas Power Plant

19

2016 Japan LNG Imports
87.5 MM tonnes of LNG (~12 BCFD)
Seeking Regional Supply Diversification
Adding North American Resources to the Mix reduces dependency on Middle Eastern and Russian supplies

Figure 6. Japan's LNG imports by source, 2016



other: Algeria, Egpyt, Norway, Equatorial Guinea, Trinidad, Yemen, Norway, Peru, U.S., and re-exported amounts

Source: IHS Energy

Current Regional Totals

Middle East -24%

Russia – 9%

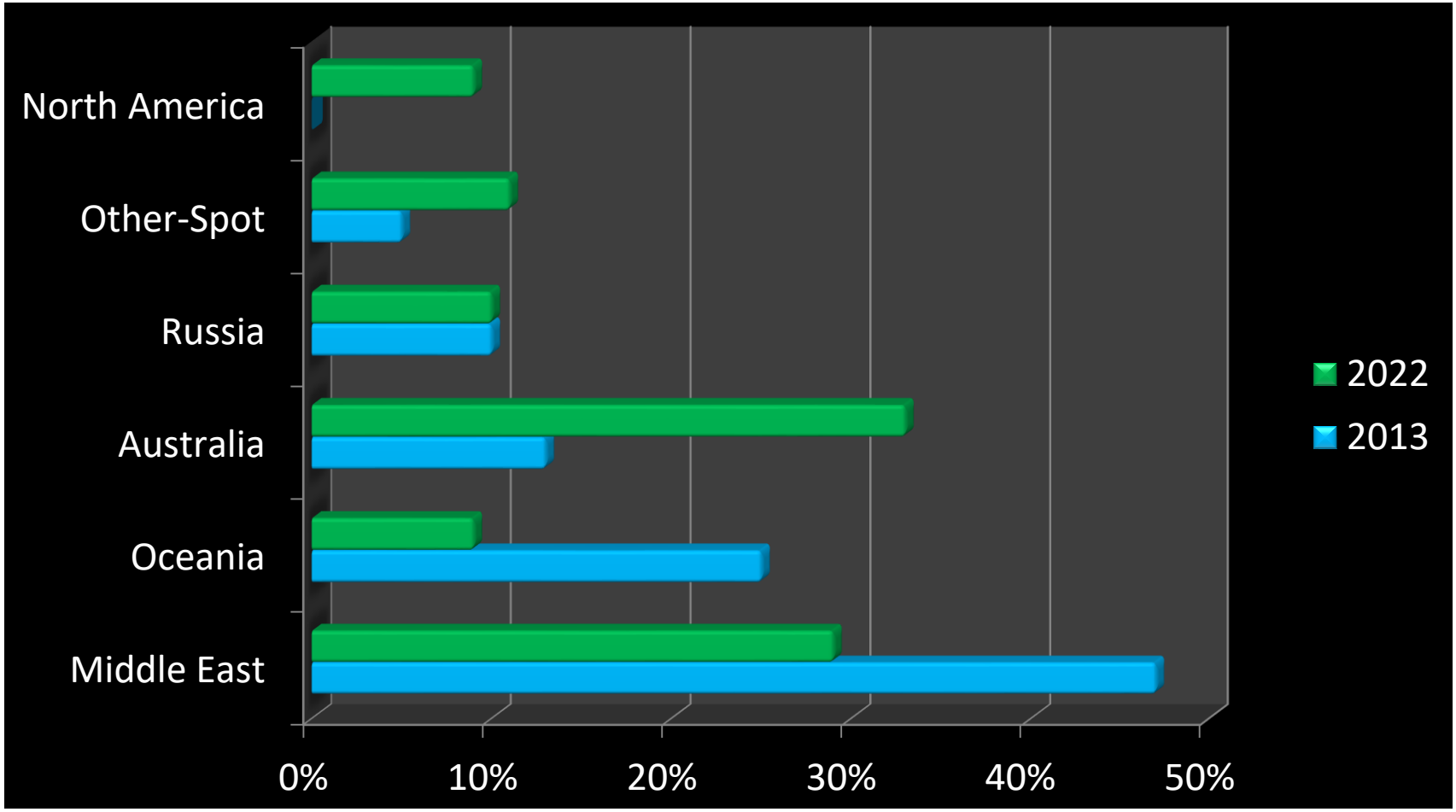
Oceania – 36%

Australia -27%

Africa – 2%

Other – 2%

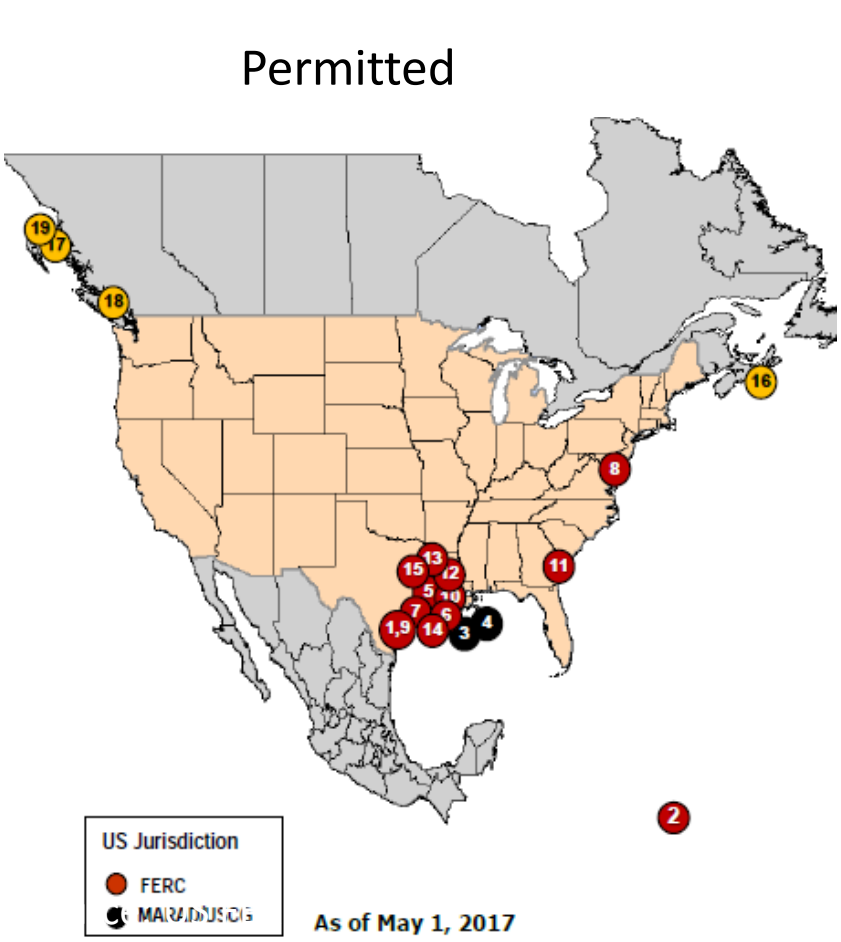
JERA LNG Regional Supply Sources
2013 & 2022

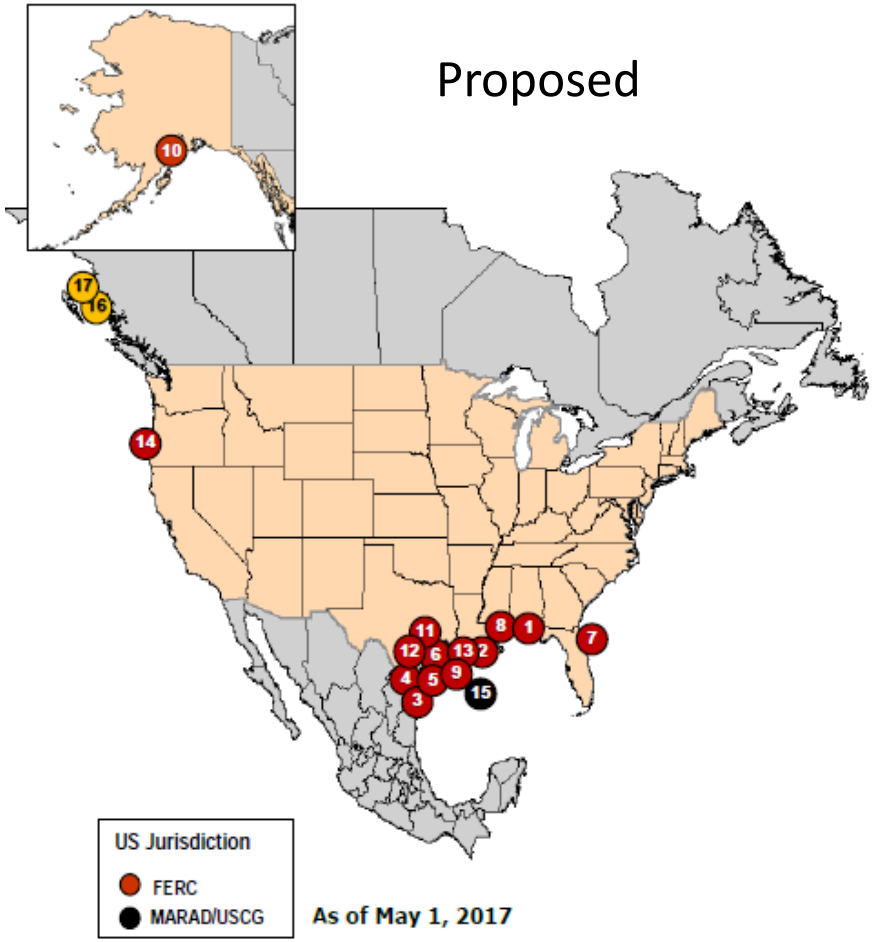


"In the 2020's, oil-linked LNG purchases will fall significantly, and the weight of purchases linked to gas prices in the West and Asian market prices will rise". (JERA President Yuji Kakimi, 2/10/16).

US LNG exports – JCLNG provides an Alternative

- US LNG export activity is highly concentrated in the US Gulf of Mexico
- Projects need to be developed in locations other than the Gulf Coast for US LNG exports to reach their full potential





Panama Canal risk

- Asian LNG demand from USGC in 2020 requires 2-3 Panama Canal transits per day
- Canal transits are currently capped at 7 per day, with an additional firm transit set for late this year
- Only 1 transit per day is reserved for LNG.
- US LNG will compete with US LPG, container ships, and other traffic
- USGC shipping costs to Japan increase by ~$1.00/mmbtu without Panama Canal

US energy exports were not considered when Panama Canal investment decision was proposed in 2006

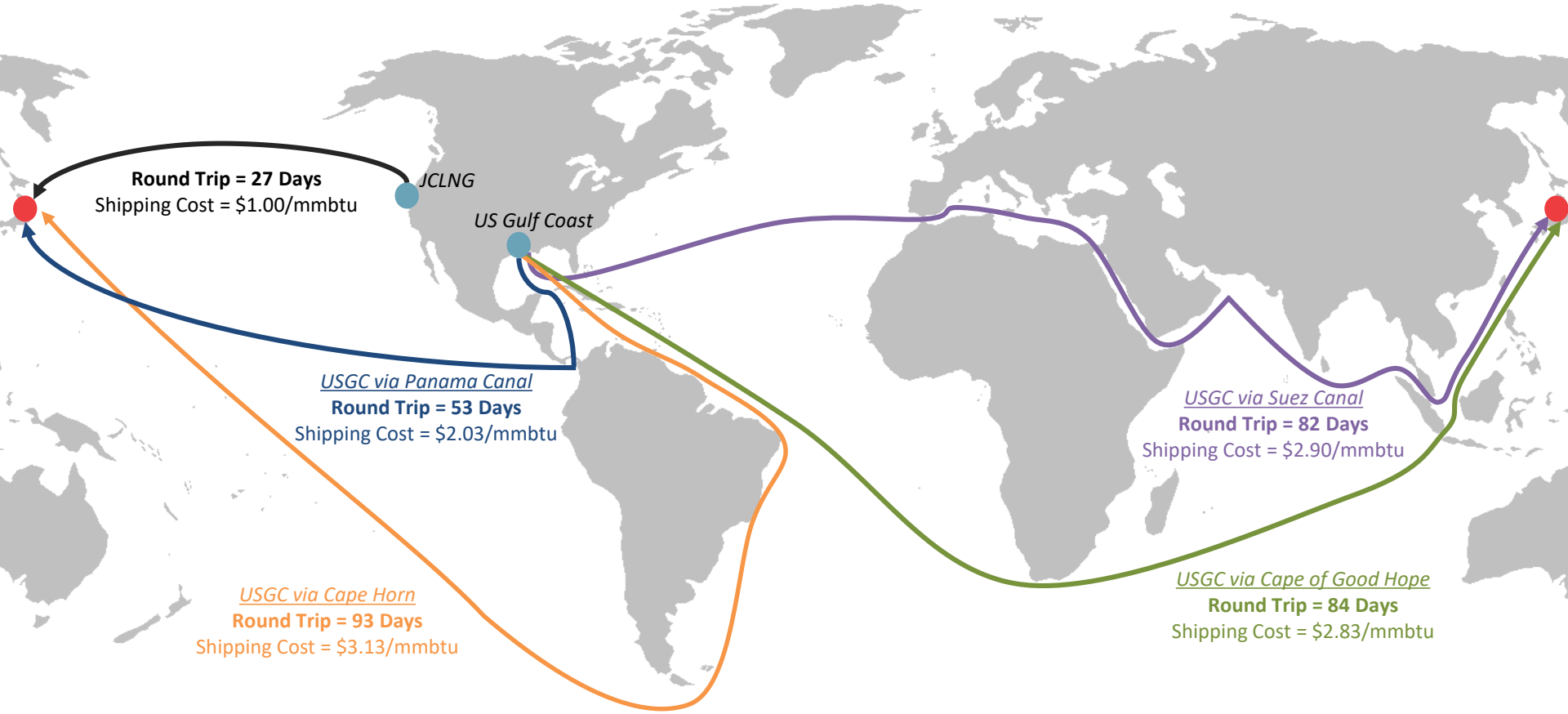
Uncertain access to Panama Canal expansion puts additional USGC LNG shipping costs at risk

Shipping logistics comparison

Assumptions:

- 170,000 m^3 DFDE ships; time charter rate = $85,000/day
- 90% ship utilization rate

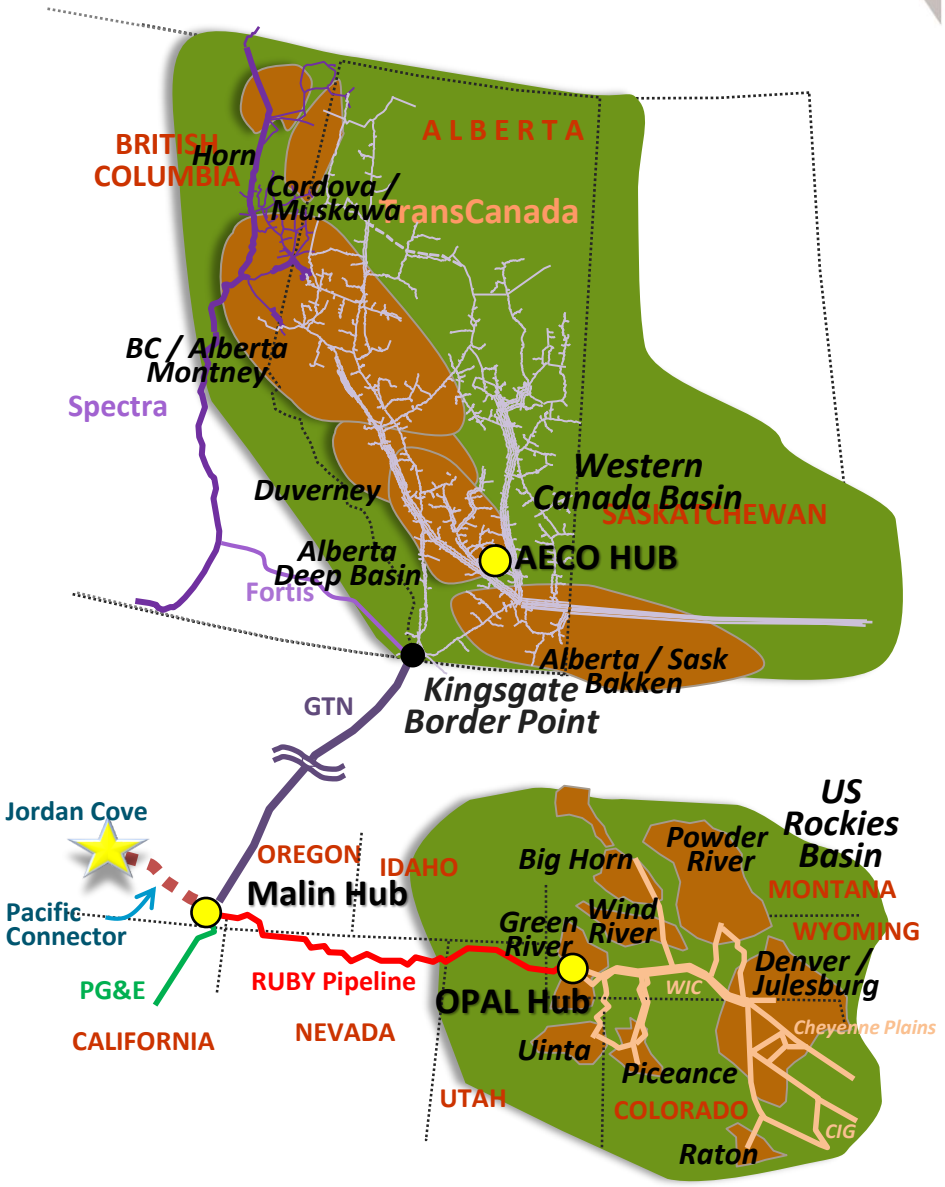
US West Coast and US Gulf Coast Shipping Pathways to Japan(1)



(1) Shipping distances derived from Platts Portworld shipping distance calculator

Appeal of Jordan Cove LNG to Asian Buyers

- Realization of N.A. natural gas-linked LNG price
- JCLNG operates under a tolling model (fee for Service)
- Access to the U.S. Rockies and Western Canada Sedimentary Basin, each with multiple major producing areas
- Potential to build a value chain in North America by participating upstream
  - Contract purchase with producers
  - JV for gas reserves in the ground



Regulatory & Schedule Update

Key federal permits - status

- FERC
  - Schedule for environmental review due in early 2018 following data request response (January 23, 2018)
  - Applicant prepared Biological assessment submitted to FERC on December 22, 2017 for purposes of Endangered Species Act Section 7 Consultation
- US Army Corp of Engineers (USACE)
  - 404/10 Joint Permit Application with the Oregon Department of State Lands Removal-Fill permit – filed in October 2017, continuing to provide supplemental information, public notice period in early 2018
  - 408 review underway by USACE civil works division – filing initiated in September 2017 , 60% design package filed January 2018
- Bureau of Land Management (BLM), US Forest Service, and Bureau of Reclamation
  - BLM have identified necessary amendments to the RMP which will be analyzed in the NEPA documents
  - JCLNG have submitted the right-of-way application (SF-299) and Plan of Development (POD) in January 2018
- U.S. Forest Service
  - Previously identified amendments to Land Resource Management Plans will be analyzed in the NEPA documents
- U.S. Fish and Wildlife Service and National Marine Fisheries Service
  - Applicant prepared Biological Assessment submitted to FERC on December 22, 2017; next step to submit a supplemental mitigation plan (SMP)
  - Marine Mammal Protection Act Application will be filed with NMFS in mid-2018

Key Oregon and federally delegated State permits

- Oregon Department of State Lands
  - Removal-Fill permit submitted as Joint Permit with the United States Army Corps of Engineers – filed in October 2017, providing supplemental information in February 2018
- Oregon Department of Environmental Quality (ODEQ) (federally delegated permits)
  - Clean Air Act – Amendment of Air contaminant discharge permit for the LNG terminal; permit originally issued in 2015; with EPA sign-off, will reform existing PSD permit to less onerous Type B State NSR permit; being processed by ODEQ
  - Clean Air Act – Air contaminant discharge permit for pipeline compression facilities; filed in October 2017 and being processed by ODEQ
  - Clean Water Act Section 401 Certification; filed in October 2017 jointly with the USACE 404/10 application; continuing to provide supplement information, public notice period in early 2018
  - Clean Water Act Section 402 NPDES Stormwater permit; to be filed one year prior to construction
  - Clean Water Act NPDES discharge permit – issued; technical modifications forthcoming
  - Clean Air Act Title V operating permit; to be filed one year after operation
- Oregon Department of Fish and Wildlife
  - Fish passage and in-water blasting permits to be filed in early 2018
- Oregon Department of Land Conservation and Development (Coastal Zone Management Act)
  - Consistency determination will be issued once all applicable state and local permits are obtained, application to be filed in early 2018
- Local land use planning application process across three counties ongoing (no local land use authorizations needed from Jackson Co.)

FERC process and schedule

Given the advanced stage of this project and the extensive environmental review that has already occurred, Jordan Cove LNG is working to the following schedule:

Activity	Date
Pre-filing meeting	January 5, 2017
FERC scoping open houses in Coos Bay, Roseburg, Medford and Klamath Falls	Week of March 20th
All draft Resource Reports submitted	June 2017
FERC NOI issued	June 9, 2017
NGA Section 3 and 7c application submitted (end of pre-filing)	September 21, 2017
Receipt and Response to RFIs (Requests for Information)	Nov 2017 – Mar 2018
Draft Environmental Impact Statement	2018
Final Environmental Impact Statement	2018
FERC Order granting authorizations	2018
Other major permits	2018

Jordan Cove LNG anticipates commencing construction in the first half of 2019 and the target in-service date is late 2022 for the pipeline and the end of 2023 for the LNG terminal

Highly confident that permits will be secured in 2018

Project Benefits to Colorado

Jordan Cove LNG – The right project, right time for the U.S. Oregon and Colorado

How does a project with investment concentrated in Oregon have a positive impact on Colorado?

- Given the direct connection between our Pacific Connector Gas Pipeline and the Ruby Pipeline, there is an advantageous link to mostly-untapped Colorado natural gas plays
- Jordan Cove LNG connects Colorado natural gas basins to the world's largest and fastest growing LNG market
- Jordan Cove LNG requires a supply equal to approximately 25% of Colorado's current natural gas production, every day for the next 20 years.
- Piceance Basin and Ruby Pipeline infrastructure already in place and is underutilized, avoiding the need to build major pipelines in order to delivery natural gas to west coast
- Sustainable and predictable resource development to mirror 20-year LNG contracts, avoiding the historical boom/bust natural resource cycle
- Increased natural gas severance tax to counties and state
- Jordan Cove LNG customers have already visiting Colorado to understand opportunities to participate in natural gas resource ownership

Jordan Cove LNG to provides access to premium priced natural gas markets

Pembina Pipeline Corporation

Thank-you

Jordan Cove LNG℠

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