What is the Jordan Cove Project?

Jordan Cove Liquified Natural Gas Terminal (JCLNG)

- 240 acre site
- 7.8 million tons per annum (mtpa) facility
- ~120 port calls annually at Coos Bay

Pacific Connector Gas Pipeline (PCGP)

- 229 mile; 36” diameter, natural gas pipeline
- 1.2 billion cubic feet per day (bcf/d) design capacity
- Interconnects with the existing GTN and Ruby pipelines at Malin, Oregon
Rendering of the LNG Terminal looking Northeast
Jordan Cove’s Strategic Rationale

- What makes Jordan Cove LNG attractive?
  - WCSB and Rockies provide abundant long life gas supply
  - Long-term gas supply at Malin Hub from two long-haul pipelines fed by major resource plays
  - No hurricane risk compared to US Gulf Coast alternatives
  - Completed competitive bid process for lump sum, turn key EPC contract – resulting in cost confidence

- How Pembina’s expertise is helping advance Jordan Cove LNG
  - Proven track record of successfully constructing and operating major projects on-time and on-budget
  - Demonstrating history of relationship building across all stakeholder groups including Tribes, landowners, communities and regulators
  - Robust balance sheet and low cost of capital supports project financing

Competitive advantages make Jordan Cove a premier “second wave” LNG project.
Asian LNG and North American Gas Pricing (US$/mmbtu)

- Fukushima nuclear disaster (March 2011)
- Brent oil price averaged ~$108/bbl between 2011 and 2014
- Brent oil price averaged ~$51/bbl (2015 – 2017)
- Start-up of Australian and US LNG export volumes
- Nuclear re-starts in Japan

Medium Term Outlook
- Average AECO discount to Henry Hub estimated at ~$1.30/mmbtu
- Average AECO discount to JKM estimated at ~$7.00/mmbtu

(1) Annual average of Asian Term, Asian Spot, Japan, and South Korea LNG pricing forecasts from IHS
(2) Bloomberg forward curve as at February 7, 2019
Highly Competitive Landed Cost to Far East Asia

**Global Peer Group – Delivered Cost to Far East Asia (US$/mmbtu)**

Jordan Cove LNG is among the most price competitive projects in North America and beyond.

(1) Based on JCLNG interpretation of IHS data; liquefaction and project pipeline breakeven IRR of 10% and 7%, respectively
(2) Corresponding liquefaction and project pipeline rate that yield a 10% and 7%, breakeven IRR, respectively, consistent with breakeven rates referenced within the global peer group
(3) Round-trip shipping costs from IHS, assuming 170,000 m³ LNG vessels at a time charter rate of $85,000/day
Shipping Logistics Comparison

North American Shipping Costs to Far East Asia (US$/mmbtu)\(^{(1)(2)}\)

- **US Gulf Coast**
  - Round Trip = 27 Days
  - Shipping Cost = ~$1.00/mmbtu

- **USGC via Panama Canal**
  - Round Trip = 53 Days
  - Shipping Cost = ~$2.00/mmbtu

- **USGC via Cape of Good Hope**
  - Round Trip = 84 Days
  - Shipping Cost = ~$2.80/mmbtu

- **USGC via Suez Canal**
  - Round Trip = 82 Days
  - Shipping Cost = ~$3.00/mmbtu

- **USGC via Cape Horn**
  - Round Trip = 91 Days
  - Shipping Cost = ~$3.00/mmbtu

U.S. west coast holds significant shipping cost advantages to Far East markets and avoids Panama Canal

(1) Shipping distances derived from Platts Portworld shipping distance calculator
(2) Assumes 170,000 m³ DFDE ships, time charter rate = $85,000/day, and 90% ship utilization rate
JCLNG Shipping: No Panama Canal Risk

• Jordan Cove LNG customers benefit via lower shipping costs to Asia vs. USGC LNG via Panama Canal
• Asian LNG demand forecasts require 2-3 Panama Canal transits per day to serve USGC LNG under construction
• Additional USGC capacity will require additional Panama Canal access
• Current transit windows are capped at 7 transits per day, with an additional firm transit by the end of 2018
• Only 1 transit per day is reserved for LNG, sufficient for only 12 to 15 mtpa
• US LNG will compete with US LPG, container ships, and other traffic
• Shipping costs to key Asian markets likely to increase by ~$1.00/mmbtu without Panama Canal, totaling ~$3.00/mmbtu
Moving Gas to JCLNG

- JCLNG connects to two world class, low cost gas basins – WCSB and Rockies
- WCSB is connected by the 42-inch and 36-inch GTN pipeline system owned by TransCanada
- Rockies is connected by 42-inch Ruby pipeline owned by Kinder Morgan/Pembina
- Both pipelines interconnect at Malin, Oregon – the entry point for the PCGP pipeline that will serve JCLNG
- Ruby has over 1 Bcf/d of available capacity in 2025

Well established and reliable infrastructure available at a reasonable cost
Jordan Cove’s business model

**NATURAL GAS SUPPLY**

Asian customers buy their own gas from Canadian or U.S. Rockies supply basins (or both). The Malin, OR hub is connected by existing pipelines to AECO hub via GTN and the Opal hub via Ruby.

**TRANSPORTATION**

Pacific Connector Gas Pipeline will provide transportation from the Malin, OR hub to the Jordan Cove liquefaction terminal.

**LIQUEFACTION**

Jordan Cove LNG will provide liquefaction services for a fixed fee on a take or pay basis plus an opex fee.

**DELIVERY**

The customer is responsible for transporting LNG from the Jordan Cove LNG terminal to its final destination.

What Jordan Cove LNG does
Project Update and Timeline

• Executed lump-sum turnkey EPC contract on JCLNG
  – EPC awarded to consortium comprised of Kiewit, Black & Veatch and JGC
• FERC published the Notice of Schedule on August 31, 2018
  – FERC Draft EIS published March 29, 2019
  – Final FERC decision anticipated in January 2020
• State permitting process advancing well with completion expected to follow shortly after FERC approval
  – Air
  – Water
  – Removal Fill
  – County Land Use & various other State and local permits

Notice of Schedule is an important milestone and reinforces our ability to meet first LNG in 2024
Thank you

Building Something Extraordinary