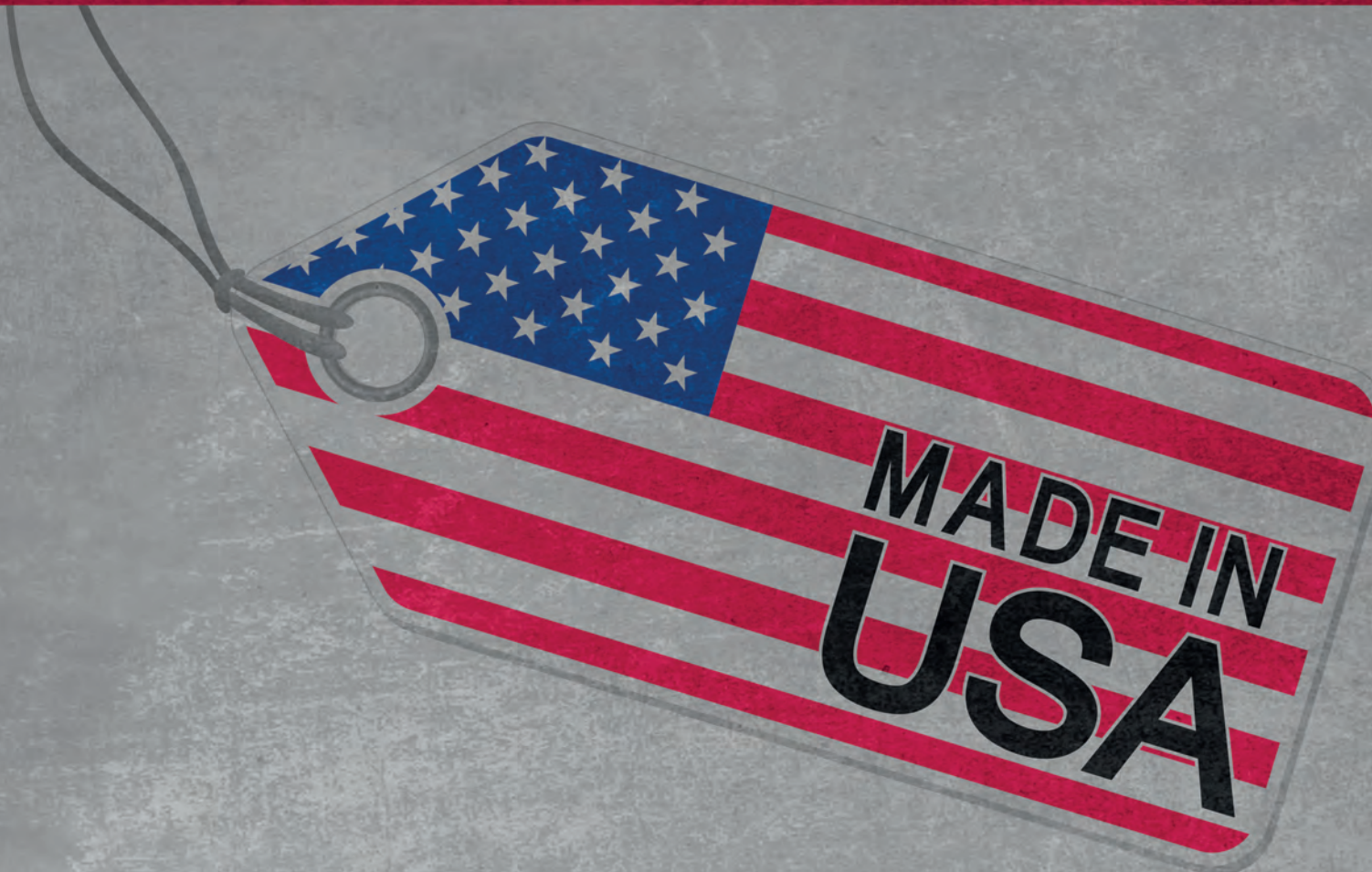


# Fit for EXPORT

**Guy Dayvault, Veresen Inc., USA,** examines why US West Coast LNG tolling facilities are fit for Asian markets.

**F**or more than 40 years, Kenai, Alaska has been the only LNG supply from North America exported to Japan. While new large scale LNG supply from Alaska, which could potentially increase liquefaction capacity more than tenfold, is being conceived, Alaska is only one of the places for Japan's LNG buyers to potentially access LNG from North America's western coastline.<sup>1</sup> Infrastructure developers and International Oil Companies (IOCs) continue to develop new LNG supply projects in the Western Canadian province of British Columbia (B.C.) and along the Pacific coast of the US in Oregon. While many industry experts considered Oregon an unlikely LNG supply source, Jordan Cove LNG has emerged as a front-runner among US LNG exports to move ahead. It will likely be the first liquefaction capacity built on the US west coast since the late 1960s. Many milestones have been accomplished, which make the prospects more viable for an export facility in Coos Bay, Oregon. Examples of the milestones achieved include the following:

- US Federal Energy Regulatory Commission (FERC) final environmental impact statement (EIS) and Certificate scheduled (12 June 2015 and 10 September, respectively).
- US Department of Energy (DOE) non-free trade agreement (FTA) conditional authorisation (24 March 2014).<sup>2</sup>
- Appointment of experienced LNG industry executive, Betsy Spomer, as President and CEO of Jordan Cove LNG (October 2014).<sup>3</sup>





- ▶ FERC issued a draft EIS (7 November 2014).
- ▶ Six successful FERC pipeline hearings in towns along the feed gas pipeline right of way (December 2014) in Roseburg, Canyonville, Medford, Klamath Falls, Malin and Coos Bay.
- ▶ State of Oregon's Energy Facility Siting Counsel deemed complete the application for the liquefaction plant's South Dunes power plant (December 2014).

With local and federal regulatory approval imminent for Jordan Cove LNG, a key question remains: 'what markets will the facility ultimately serve?' Will Jordan Cove LNG provide the solution for buyers in Japan, another Asian market, or a mixture of markets?<sup>4</sup> Jordan Cove LNG already has many of the major characteristics that appeal to the LNG supply mandate from Japan's Ministry of Economy, Trade and Industry (METI). Alternatively, LNG supply from Jordan Cove LNG may also serve the needs of other traditional markets in South Korea and Taiwan, or the growing need for LNG in China for power generation, transportation fuel and industrial consumption. Jordan Cove LNG's primary attraction for Asian LNG buyers is the opportunity to diversify their LNG supply portfolio in significant ways.

## Unique diversification

### Source diversification

The US West Coast and Canadian West Coast offer a new source location heretofore untested in LNG trade, although it is geographically similar to the long-standing Kenai, Alaska LNG trade route to Japan.

### Price indexation diversification

Jordan Cove LNG will offer price indexation to North American gas prices with gas supplied from the US Rockies or the Western Canadian Sedimentary Basin (WCSB), providing exposure to an assortment of index choices: Henry Hub, AECO, Opal or Malin.

The recent collapse of crude oil prices from a Japanese customs clearing price (JCC) average of US\$110/bbl in 2013 to under US\$50/bbl Brent in early 2015 have yet unknown impacts on new LNG sources. Recognising that most traditional oil-indexed LNG contracts have a three to six-month lag in oil price impact on Delivered Ex Ship (DES) or Free On Board (FOB) prices, it will be late spring and early summer 2015 before the full

impact of low oil prices (in November 2014 to January 2015) are reflected in the average delivered cost of LNG to many traditional LNG buyers.

While industry experts often tend to focus on spot LNG prices that have recently fallen below US\$7/million Btu, it is the long-term security of supply to meet ever growing demand that concerns utility gas buyers in the East of Suez LNG markets, particularly Asia-Pacific gas market participants. Proponents of new LNG supply generally fall into two categories: gas resource owners<sup>5</sup> or infrastructure developers.<sup>6</sup>

Gas resource owners are generally able to take more risks due to their large balance sheets, resource ownership and business profile in contrast to the infrastructure developers. Gas resource owners normally set commercial structures linked to underlying commodity prices and make a final investment decision (FID) based on economic metrics such as hurdle rates for internal rate of return (IRR), net present value (NPV) and other measures of investment efficiency for allocating their scarce capital. These economic metrics are typically evaluated at a price deck of expected future oil and gas prices, with stress tests to the downside (and sometimes to the upside) to verify project viability in a lower than expected pricing environment (as well as the potential bonanza returns from a higher than expected pricing environment).

The recent collapse in global oil prices will materially decrease the downside price deck used to stress test new LNG projects in comparison to FID decisions taken in the past few years. For example, while global oil prices were running in the US\$100 – US\$115/bbl range, the decision makers in IOCs likely required a downside stress test with long-term crude oil prices at US\$70 or US\$75/bbl. However, with markets having tested US\$50/bbl recently and broken through that perceived floor into the US\$45 – US\$50/bbl range, the price deck used by IOCs for stress testing major new exploration and development projects (including LNG) will likely change. Industry experts and government authorities must take views on future commodity prices, a consideration that is well beyond the scope of this article. However, there is a preponderance of forecasts suggesting that over the coming months or next couple of years, the price of crude oil will hit a floor and recover into a range substantially higher than January 2015, but lower than the strong prices seen in 2013 and early 2014.



**Figure 1.** Aerial view of the Jordan Cove Energy Project.

Investment capital for gas resource owners will become scarcer as revenue from their oil and gas production will be much lower than recent years, as a result of current low crude oil prices. This will tend to make their investment policies more cautious. It might be reasonable for some future investments to be stress-tested at oil prices of US\$50/bbl or even US\$40/bbl in an abundance of caution. These would not be the base case for FID, but a stress test for how the project would survive a two or three-year very low price environment.

This could result in fewer than previously expected, or even very few, FID decisions being taken by gas resource owners for new LNG supply in the remainder of this decade, especially for some of the higher cost, very large, or more remote LNG projects, or those projects being developed in areas with evolving petroleum fiscal regimes.

In contrast, the infrastructure developers typically primarily examine the expected revenue stream from the liquefaction facility to create a steady and predictable revenue income with less upside from commodity price volatility. Thus, the decision-making process for approving and sanctioning new developments by infrastructure developers will be less impacted by volatility and lower global crude oil prices or Henry Hub natural gas prices. Depending on the business model (i.e. the commercial model) of the specific infrastructure developer, there may exist substantial or limited upside revenue from sale of proprietary LNG cargoes or incremental tolling capacity controlled by the infrastructure developer.

For the pure tolling model, such as the one being proposed by Jordan Cove LNG, the business decision for making FID on the new supply source is independent of oil and gas prices. This is because the facility owner will not be exposed to the commodity price changes that should and will be logically controlled by the tolling capacity customer who lifts LNG directly from the facility. The tolling customer at Jordan Cove LNG will have traditional FOB responsibilities, while owning more upstream control than a traditional FOB LNG buyer. Thus, it is different and more likely for infrastructure developers to make FID on new LNG supply facilities than gas resource owners, especially over the next few years as oil prices are expected to recover.

If this scenario develops, there could be a shortage of LNG supply in the period 2020 – 2025, as gas and LNG demand grows. This growth will occur not only in traditional areas of power generation, heating and industrial use, but also in the areas of transportation fuels to help improve air emissions, as bunker fuel in ocean-going vessels and for local ferry boats and long haul trucking markets. As a result of that shortage of LNG supply and perhaps crude oil supply, and if commodity prices run up in the period 2020 – 2025, then utility gas buyers without new LNG supplies would be in a difficult position. They may face high commodity prices and limited market power for securing the LNG supply they need over that period.

Thus, an argument is constructed for securing new long-term LNG supply in the current market to protect against a future time when supplies are short and demand has increased, driving up commodity prices to levels higher than those seen in late 2014 and January 2015.

## Destination restrictions and commercial terms diversification

Jordan Cove LNG will have no destination restrictions for LNG lifted at Coos Bay. In addition, the tolling commercial model fixes the cost of liquefaction and allows the LNG buyer to fix or control

as they choose other upstream costs. This covers both traditional LNG shipping costs and other costs upstream of liquefaction, including the following:

- ▶ Gas pipeline transportation in the US and Canada.
- ▶ Gas resource and procurement strategies.
- ▶ Gas storage.

The transportation costs for gas supply from the wellhead to the liquefaction plant can be managed with the choice among hundreds of gas resource producers from whom to buy gas delivered on various gas pipelines. This allows the LNG buyer, whether an Asian utility, gas or power company, or a trading company, to vertically integrate their business model to control their entire gas supply value chain. The Asian utility will be able to fix all costs or directly manage all cost components for delivering LNG from North American gas reserves in the ground through transportation, gas storage, liquefaction, LNG storage, LNG shipping and regasification.

## Gas supply basin diversification

Jordan Cove LNG will be connected to the US and Canadian natural gas pipeline grid at Malin, Oregon, with access to two large gas supply basins, specifically the US Rockies and the WCSB. Connectivity to existing gas storage is also available, not only in the market hubs of AECO (Alberta) and near Opal (Wyoming), but also in Northern California. Here, the substitution/displacement of gas flows on Ruby Pipeline (from Opal) or Gas Transmission Northwest (GTN) Pipeline (from AECO) could allow Jordan Cove LNG tolling customers to synthetically store gas in Northern California and pull that gas out of storage to supply Pacific Gas and Electric Co. (PG&E) while accepting substitution/displacement deliveries at Malin, Oregon, from PG&E on Ruby or GTN gas pipelines.

The West Coast of North America LNG supply has access to considerable gas resources in the following locations:

- ▶ Alaska, with 35 trillion ft<sup>3</sup> of discovered North Slope gas reserves, including Kuparuk River, Prudhoe Bay and Point Thomson.<sup>7</sup>
- ▶ WCSB, with 1177 trillion ft<sup>3</sup> of resource.<sup>8</sup>
- ▶ The US Rockies, with 421 trillion ft<sup>3</sup> of resource.<sup>9</sup>

A fundamental concern with all LNG supply is both sufficient gas supply and adequate access to gas supply. Traditionally, a gas reserves certificate from a well-recognized petroleum engineering company for a specific gas field(s) has been used for this assurance. However, in LNG supply projects based in the US lower 48 states, the key is connectivity to liquid gas markets through the US gas pipeline grid. In the US Gulf Coast, tolling capacity customers have taken gas supply capacity on long haul pipelines such as the Tennessee Gas Pipeline (TGP), where Mitsubishi took 600 million ft<sup>3</sup>/d capacity for 20 years.<sup>10</sup> Other companies at Freeport are in precedent agreement with Kinder Morgan for transportation capacity from the Eagle Ford oil and gas field into Stratton Ridge.<sup>11</sup>

## Shipping route diversification

Various constraints and shipping route challenges exist on most traditional LNG routes for East of Suez supply to Asian LNG markets through the South China Sea, Straits of Malacca, and the Strait of Hormuz. The new LNG supply sources in the

US Gulf Coast (USGC) will manage the complexity of the annual hurricane season and the expanded Panama Canal. Jordan Cove LNG will allow a new shipping route that avoids these constraints for LNG to North Asia. The Northern Pacific shipping route for large vessels (in scope of LNG carriers) is a well-established trade route for LNG from Alaska and for container ships and bulk carriers transiting from North Asia to Vancouver, Seattle, Portland, San Francisco, Los Angeles/Long Beach and San Diego.

A new and yet untested global LNG shipping route constraint is likely to develop for USGC LNG supply via the Panama Canal. Despite reports that the expansion at Panama was developed for container ships (carrying standard 40 ft containers), which will reportedly have priority rights to transit capacity, the Panama Canal expansion has allowed the contemplation of a new LNG trade route from the USGC to supply LNG markets in Asia (Japan, South Korea, China [through portfolio suppliers] and Indonesia). However, as yet there is no indication of what constraints may develop around Panama Canal transit and how much, if any, of the new LNG supply from the USGC and US East Coast will have to seek other more traditional routes to Asian markets.

The Panama Canal will reportedly be constrained to 12 LNG vessel passages per day and new tolls have been outlined in the provisional tariff for passage by LNG vessels. While the cost of transit is important, another concern is potential delay and difficulty in predicting the duration of delay at either east or west end of the Panama Canal. This could complicate fleet management and certainly introduces cost and new operational risks for both late deliveries and missed lifting windows. Expecting that Annual Delivery Plans will be quite full at USGC supply points, there could be challenges getting replacement lifting windows for late arrivals at the LNG facility, if an LNG vessel has to wait longer than expected in a ballast journey eastbound at the canal. Furthermore, a delay in laden journey westbound through the canal could result in a cargo that can no longer make its scheduled discharge window and must be swapped for an earlier arriving cargo or, in a worst case scenario, be sold at a huge discount for prompt discharge on approximately 15 days notice.

## Other proposed LNG sources

While there are many other proposed LNG sources on the West Coast of North America with similar geographical and shipping route diversity, these proposed LNG sources offer less diversity in gas supply and price indexation than the tolling model at Jordan Cove LNG. The preponderance of these new LNG sources will be in B.C., where many projects continue to make progress. These projects could eventually be connected by new pipelines to the vast gas resources in the WCSB, to supply LNG to Asian gas/LNG markets. However, these B.C. projects do not have the supply diversity of also being connected to the US Rockies, and appear to be challenged by various additional unique concerns including the following:

- ▶ High infrastructure costs, including the need for very large diameter (48 in.) long haul gas pipelines, which can cover more challenging terrain and are much less common size pipelines in North America than the required 36 in. dia. supply pipeline for Jordan Cove LNG.
- ▶ Concerns and uncertainty about social licenses, i.e. First Nations land ownership and treaties.
- ▶ Remote plant locations with very small populations and limited existing infrastructure, resulting in consequential labour constraints and costs.

- ▶ Limited connectivity to existing underground gas storage at AECO or elsewhere on the gas grid.
- ▶ Limited electric power generation capacity and environmental constraints on permitting requisite power generation facilities.
- ▶ A need for high FOB prices to support the cost of infrastructure and exploration and production (E&P) development costs through high oil prices, combined with close to traditional (14.85%) LNG price slope.

These challenges have logical solutions that can be found using the expertise and experience of the project proponents. However, recent declines in global oil prices and other delays encountered in B.C. suggest that the timelines are less certain than previously anticipated. Furthermore, it is expected that none of these projects are tolling business models and will be based on more traditional LNG sale and purchase agreement pricing regimes.

## Conclusion

Jordan Cove LNG has accomplished several regulatory and development milestones in the past year, confirming the project's potential to be built for LNG supply to gas markets in the Asia-Pacific region. **LNG**

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