Natural gas liquid exports via Pacific Northwest ports

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In 2014, the Oxford Institute for Energy Studies report, *The US Shale Revolution and the changes in LPG Trade Dynamics*, observed that "One of the significant developments associated with the U.S. shale revolution and that has attracted little attention from market analysts, is the sharp expansion in the U.S. liquefied petroleum gas (LPG) exports. Substantial increases in domestic supply have not only meant that U.S. imports of LPG, which mainly come from Canada, have dwindled, but the U.S. has now become one of the world's biggest exporters of LPG. According to the United States Energy Information Agency (EIA), U.S. LPG exports are expected to persist well into the next decade as natural gas liquids (NGLs) output in the U.S. continues its upward trend." In September 2016, the EIA announced that propane is now the second-largest U.S. petroleum product export, surpassing motor gasoline.

Historically, Canada's natural gas and natural gas liquids (NGLs) production was consumed within the country or shipped to the United States. With the U.S. successfully developing their shale gas reserves, it is becoming a net energy exporter in some commodities. In turn, this is having a knock-on impact. Domestic U.S. production is displacing Canadian natural gas and NGLs. Consequently, new transportation infrastructure and services are needed. This article explores the supply of natural gas

Photo courtesy Altagas

Currently, the only existing LPG export terminal on the west coast of North America is in Ferndale, Washington. *Photo courtesy Altagas*

liquids and export terminal developments in the Pacific Northwest.

Natural gas liquid supply

Natural Resource Canada indicates that raw natural gas as it comes from the wellhead is mostly comprised of methane (the largest constituent of household natural gas), but also contains various heavier hydrocarbons. The heavier hydrocarbons consist of ethane, propane, butanes and pentanes, and are called natural gas liquids (NGLs).

B.C.'s natural gas supply is estimated at almost three trillion cubic feet. To put it in perspective, each year, industry extracts about four trillion cubic feet of natural gas. Based on that amount, B.C. has over 150 years' worth of natural gas supply at present consumption rates. Also, there are the natural gas resources in Alberta that need to find new export markets.

In the current price environment, upstream producers have focused their efforts on resource plays in NGL-rich areas. In a 2014 presentation to the Canadian Propane Association, Mr. Gerry Goobie, Principal, Gas Processing Management Inc., noted that "Producers will target rich gas prospects and all recoverable NGLs will be produced. The NGL component has become a much larger portion of the revenue from a gas well in recent years."

With an increasing availability of surplus NGL in Canada, producers have the option to either curtail extraction, seek North American buyers who need the gas liquids for petrochemical feedstock, or export to global LPG markets overseas.

In some respects, the export of NGLs has the potential to increase in conjunction with LNG projects. Many factors will come into play as we search for new markets. LNG is a global market that is dynamic in nature. The price of LNG in Asia has historically been based on existing long-term overseas supply contracts at prices more than what was being paid for natural gas in the North American market. Crude oil price has also had an effect on the current LNG pricing model, but the longer low oil prices remain relatively low, it is harder to justify a final investment decision now to develop an LNG export industry.

Mr. Peter Howard, President Emeritus of the Canadian Energy Research Institute, described two LNG export approaches at a 2015 Nautical Institute conference on maritime energy transportation. The Petronas development represents an example of a "hot gas" project (where the natural gas liquids would be left in because the end customer would use the gas for heating purposes) and the Shell project was an example of "lean gas" where the liquids would be removed.

The above factors will impact the proposed LNG export projects being considered for Canada's Pacific Coast. However, the needs of customers in the LNG importing countries are not uniform, and a variety of approaches are being taken to try and maximize the value of the natural gas resources and improve project economics, including the development of stand-alone NGL marine export terminals.

Pacific Northwest and Canadian developments

The Canadian Energy Research Institute reports that if the netback received by a producer for extracting and marketing NGLs in the local market is higher than that of leaving the NGLs for their heating value as LNG, then NGLs will be monetized locally. Production of LPG, a by-product of natural gas often consisting of propane and butane, has plateaued in Canada in recent years. But increasing shale production south of the border has kept LPG prices relatively low compared to global prices. As a result,

Canadian natural gas liquids are displaced from the U.S. market. New logistics and transportation solutions are needed to reach export markets, especially for propane. To meet the supply chain requirements driven by the needs of producers to achieve the highest netback, some significant transportation infrastructure developments have occurred.

In 2014, Petrogas acquired the Ferndale Terminal in Ferndale, Washington, the only existing LPG export terminal on the west coast of North America. Ferndale has been in operation for 40 years and handles both propane and butane shipments destined for Asia. The acquisition has been a good fit for AltaGas Ltd. and Idemitsu Kosan Co. Ltd., who both have interests in Petrogas. Cargo handling facilities include three above-ground LPG storage units, tank car, truck, and marine terminal. There are four large oil refineries at the top of Puget Sound and all rely on the Ferndale Terminal to handle butane surpluses. The terminal has been safely operated by AltaGas since 2014.

A new export LPG plant for Longview Washington was proposed. In February 2016, the Port of Longview Board of Commissioners directed the Port's Interim CEO Norm Krehbiel to discontinue all discussions with Waterside Energy LLC related to its proposals of both Riverside Refining LLC (the oil refinery) and Washington Energy Storage & Transfer LLC, which is also known as WEST (the liquid petroleum gas facility). The Port's press release indicated that for several months, the Port has worked with the project proponent to negotiate a non-binding term sheet on the WEST project, outlining key project information and financial documentation needed to move negotiations forward in a timely fashion.

Industry watchers are hoping that the proposed AltaGas development to build, own and operate the Ridley Island Propane Export Terminal near Prince Rupert will get the green light. Propane from British Columbia and Alberta natural gas producers will be transported to the facility using the existing CN rail network. The Ridley Island Propane Export Terminal will be designed to ship up to 1.2 million tonnes of propane per year. It will use existing rail lines and RTI's existing world-class marine jetty that has deep water access to the Pacific Ocean. The proposed export facility will offload approximately 50 to 60 rail cars per day and deliver, by ocean transport, about 20 to 30 cargos of propane per year to market.

The proposed project will include rail car unloading facilities, refrigeration equipment, power generation, connection to BC Hydro's grid, propane storage tanks, new piping and the addition of new loading arms to RTI's existing berth. The facility is estimated to cost between $400 million and $500 million. AltaGas is working towards a final investment decision in 2016, pending federal regulatory approvals, and is targeting commercial operations to begin exporting propane in 2018.

Conclusion

The natural gas revolution is proving to be a game changer not only in the evolution of global energy trade but also in the transportation infrastructure, modes and routes needed to support both LNG and the natural gas liquids in North America. For those in the rail port and shipping community, it may also mean becoming more comfortable leading discussions about the safety of a wide range of energy projects requiring transportation services that, to very a large degree, were previously overlooked when Canada was primarily a continental energy trader.

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