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## LIQUEFIED NATURAL GAS

Liquefied Natural Gas (LNG), is natural gas that is refrigerated to a very low temperature (-162° Celsius). At this temperature the natural gas becomes an odourless, non-toxic liquid that can be safely and efficiently transported over long distances to locations that are not served by a gas pipeline supply. With the high energy density of LNG and the low cost of natural gas supply relative to petroleum, LNG can be a more cost-effective alternative to diesel in many electricity, heating and transportation applications. Furthermore, utilization of LNG can also result in reduced air contaminant and greenhouse gas emissions, when compared to petroleum fuels.

### LNG Supply

There is currently substantial interest in developing new LNG liquefaction facilities in Canada at various scales to meet market demand. Up to five large LNG liquefaction facilities are currently being considered for development along British Columbia's north coast to be located in either Kitimat or Prince Rupert<sup>1</sup>. These proposed facilities, if constructed, will focus on exporting LNG by ship to markets in Asia.

Smaller LNG liquefaction facilities are also being considered to address domestic market opportunities. In Western Canada, Royal Dutch Shell is currently constructing a 300,000 tonnes/year liquefaction plant at their Jumping Pound gas processing facility near Calgary<sup>2</sup>. When completed in 2013, this facility is intended to service a growing transportation market supplying LNG as a truck fuel.

There is potential in the future to locate LNG liquefaction facilities in natural gas supply areas closer to markets in northern Canada. The Fort Nelson area in northeastern British Columbia is known to contain world-class natural gas reserves, with some of the largest gas processing facilities in North America located in the vicinity. Development of an LNG liquefaction facility at an existing gas processing plant in the Fort Nelson area could service large areas of northern Canada not currently serviced by pipeline.

Small scale LNG supply facilities in northern Canada could also be developed in the future if and when natural gas resources are discovered and extracted.

### Key LNG Facts

- Composed of natural gas, which is primarily methane
- 1 litre of LNG is equivalent to about 620 litres of natural gas
- LNG is about half the weight of water
- The typical energy content of LNG (24 MJ/L Higher Heating Value) is about 60% that of diesel on a volume basis
- LNG is produced, or liquefied, from natural gas using an automated refrigeration process
- LNG is transported and stored at low pressure in insulated containers
- Before utilizing, LNG is regasified by warming the LNG to -5° Celsius through heat exchangers using ambient heat sources
- LNG production, storage and handling is regulated by Canadian Safety standard CSA Z276
- Combustion of natural gas results in 30% less direct greenhouse gas emissions than diesel, per unit of energy

## Transporting, Storing and Regasifying LNG

Similar to petroleum fuels, LNG can be transported long distances by truck, rail, barge and ship. A single truck can haul up to 100,000 litres of LNG, representing 2,400 GJ of energy conversion potential. At the point of use, the LNG is transferred to insulated storage containers for eventual use. In some applications, truck delivery of LNG utilizes intermodal "ISO" containers, negating the need for permanent on-site storage. Associated with the storage facility are regasification facilities that convert the LNG to natural gas for ultimate use in electricity generation or heating applications. Depending on market needs, the storage facility can also include capabilities for transferring LNG for use as a transport fuel.

## SUPPLY LNG CHAIN



## References

1. Liquefied Natural Gas: A Strategy for B.C.'s Newest Industry, Ministry of Mines, Government of British Columbia. [http://www.gov.bc.ca/ener/popt/down/liquefied\\_natural\\_gas\\_strategy.pdf](http://www.gov.bc.ca/ener/popt/down/liquefied_natural_gas_strategy.pdf) [accessed Nov 9, 2012]
2. Shell sees long-term future for LNG and hopes Alberta project will prove the case. Truck News, Feb 9, 2012. <http://www.trucknews.com/news/shell-sees-long-term-future-for-lng-and-hopes-alberta-project-will-prove-the-case/1000894638/> [accessed Nov 9, 2012]