

Canadian Liquefied Natural Gas Import Projects

INTRODUCTION

Canadian Liquefied Natural Gas Import Projects is the second in a series of three reports that discuss liquefied natural gas (LNG). To meet projected natural gas demand requirements, North America will require increased imports of LNG. More than forty LNG import terminals are being proposed in Canada, the US, Mexico, and the Bahamas. This report provides background information on the eight LNG import terminal projects that are proposed for Canada.

NORTH AMERICA'S NEED FOR INCREASED LNG IMPORTS

Canada operates within an integrated North American natural gas market, where natural gas can be bought from many supply sources and delivered to any market through an extensive North American pipeline grid. Canadian natural gas requirements are met by domestic sources, as Canada produces natural gas in excess of what is required for domestic consumption. In comparison, the US consumes more natural gas than it produces, therefore natural gas imports are required to make up the difference. US natural gas imports are satisfied by pipeline (i.e., via Canada and Mexico) and by large ocean tankers that carry LNG (i.e., via Trinidad, Algeria, and others).

Historically, natural gas has been relatively expensive to convert to LNG and end-use prices in North America were too low to support the economics and development of an LNG import facility. However, prices have risen, production from conventional North American natural gas basins is flattening, and demand for natural gas continues to be robust. This situation has opened the door for increased LNG imports. In addition to higher domestic natural gas prices, technological advances, which have lowered the cost of liquefying and transporting LNG, are enabling LNG to become more cost competitive with conventionally-produced North American natural gas.

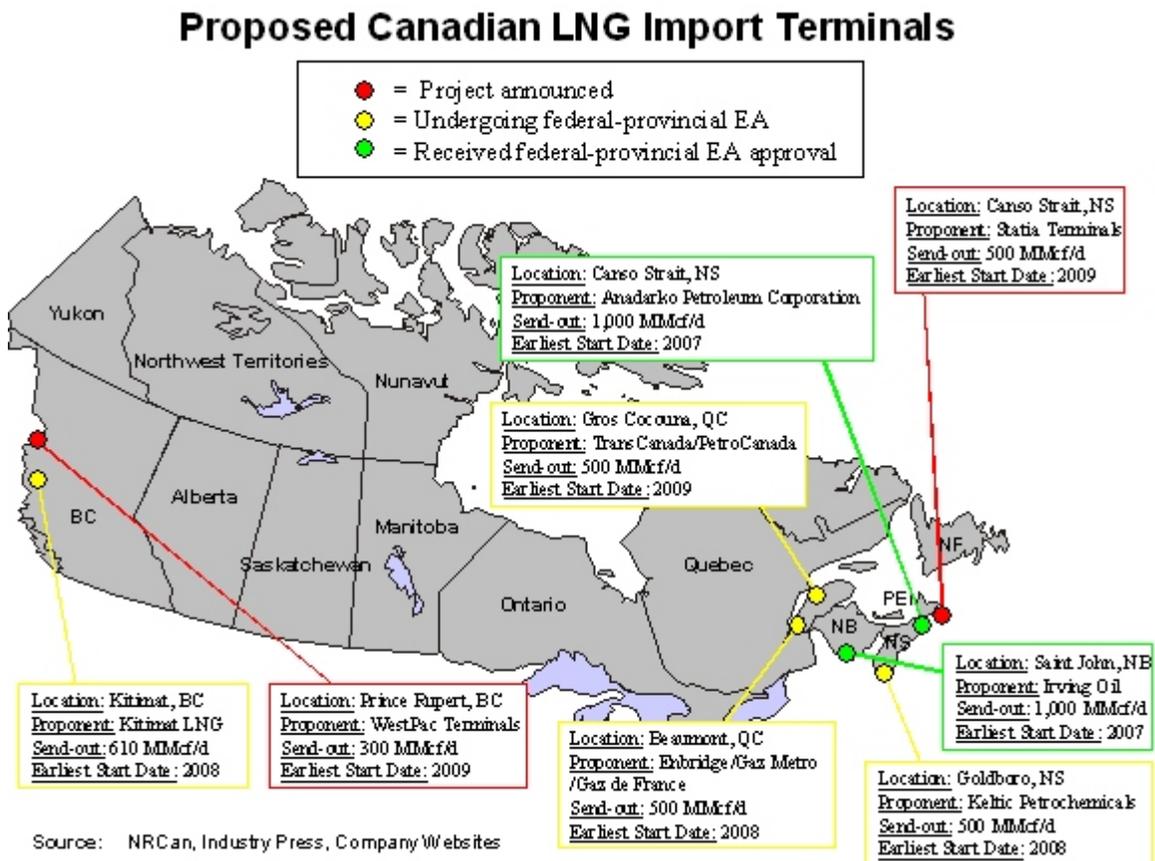
The US is the key market for growth in the LNG industry, as it currently accounts for 25% of the natural gas consumed in the world every day. There are four LNG import terminals in the US. Combined, they imported 652 billion cubic feet (Bcf) in 2004, accounting for about 2% of US natural gas consumption. Analysts predict that LNG imports will account for 15 - 20% of US natural gas consumption by 2025. This will require that existing US LNG import facilities are expanded and that new facilities are built. In addition to the expansions occurring at existing LNG facilities, there are currently more than forty proposals for the development of LNG import facilities in the US, Bahamas, Canada, and Mexico, almost all of which are entirely destined to supply natural gas to US markets.

CANADIAN LNG IMPORT PROJECTS

Currently, Canada does not import any LNG. In order to supply natural gas for Canadian needs, as well as to export additional natural gas supplies to the US, there are eight proposals to construct LNG import facilities in Canada, six of which are at various stages of the environmental assessment (EA) / regulatory review process. The proposed LNG import facilities, from west to east, are:

- WestPac Terminals (Prince Rupert, British Columbia);
- Kitimat LNG (Kitimat, British Columbia);
- Enbridge, Gaz Métro, and Gaz de France (Beaumont, Québec – Rabaska project);
- TransCanada and Petro-Canada (Gros Cacouna, Quebec – Cacouna Energy project);
- Irving Oil Limited (Saint John, New Brunswick – Canaport project);
- Keltic Petrochemicals (Goldboro, Nova Scotia);
- Statia Terminals (Canso Strait, Nova Scotia); and,
- Anadarko Petroleum Corporation (Canso Strait, Nova Scotia – Bear Head project).

The locations of these projects are shown in the map below.



In August 2004, two of these proposals – Irving Oil’s and Anadarko Petroleum Corporation’s (formerly Access Northeast Energy’s) – received federal-provincial EA approval. Four other LNG projects – Gaz Métro et al.’s, TransCanada’s, Keltic Petrochemicals’, and Kitimat LNG’s – are in the early stages of the EA review process.

The LNG projects being contemplated for Atlantic Canada are, for the most part, “import-for-re-export projects,” as the demand for natural gas in Atlantic Canada is currently not significant. The Quebec LNG projects would provide an alternative source of natural gas supply to markets in eastern Canada, as Quebec is entirely dependent on supply from western Canada. The projects being proposed in BC are largely to supply natural gas to consumers on Vancouver Island and in the Lower Mainland.

In addition to the approximately CDN \$500 million each in investment, the development of any Canadian LNG import terminal, will require pipeline takeaway capacity in order to deliver natural gas to market. In some circumstances, this will mean the expansion (i.e., added compression) or extension of an existing pipeline system, while in other cases, this will require that a new pipeline system be built.

A description and status of the proposed Canadian LNG import projects, from west to east, is provided below.

British Columbia

- a. WestPac Terminals (Prince Rupert, British Columbia)
(<http://www.westpacterminals.ca>)

Calgary-based WestPac Terminals (WestPac) is proposing to construct an LNG import facility 60 kilometres north of Kitimat at Prince Rupert, BC. The CDN \$200 million LNG facility would use the existing docking facilities at Ridley Island, which were once used to ship coal.

WestPac’s proposal plans to offload LNG at Ridley Island, where it will be transferred to insulated storage tanks. WestPac then intends to move the stored LNG onto smaller barges for delivery to markets on Vancouver Island and in the Lower Mainland.

In December 2004, WestPac entered into a 30-year land lease agreement with Prince Rupert Port Authority (PRPA) to develop its LNG import terminal on PRPA lands. The agreement gives WestPac the exclusive rights for LNG development on 250 acres of industrial land on Ridley Island.

The minimum initial send-out capacity for the LNG facility is estimated at 150 million cubic feet per day (MMcf/d), with a maximum size capacity of 500 MMcf/d. The terminal is expected to be in operation in 2009.

- b. Kitimat LNG (Kitimat, British Columbia)
(<http://www.kitimatlng.com/>)

Kitimat LNG, a Calgary-based company, is proposing to construct, own and operate a CDN \$300 million LNG import facility near the Port of Kitimat in British Columbia. Kitimat's terminal will include marine offloading, LNG storage, natural gas liquids recovery, re-gasification and send-out facilities to deliver gas into the Pacific Northern Gas (PNG) pipeline and ultimately into the Duke Energy (Westcoast) transmission pipeline system. Initial natural gas send-out capacity will be 610 MMcf/d – 110 MMcf/d local industrial loads and 500 MMcf/d to enter the Westcoast pipeline via the PNG pipeline.

Kitimat's LNG project is subject to an EA under both the *Canadian Environmental Assessment Act (CEAA)* and the *British Columbia Environmental Assessment Act*. The EA process was initiated in September 2004. Kitimat anticipates receiving all necessary permits in early 2006, to allow for adequate construction time to ensure the terminal is in commercial operation by late 2008. The cost of the project is estimated at CDN \$300 million.

Quebec

- a. Enbridge / Gaz Métro / Gaz de France Rabaska LNG project (Beaumont, Quebec)
(<http://www.rabaska.net/index.php?idL=en&idS=0>)

Developed by Gaz Métro Ltd., Enbridge Inc. and Gaz de France, the Rabaska project consists of building a CDN \$700 million LNG import terminal in the Ville Guay/Beaumont area, Quebec.

The Rabaska LNG project is subject to an EA under both the *CEAA* and the *Quebec Environment Quality Act*. In June 2004, Gaz Metro et al. officially registered a project description with the Canadian Environmental Assessment Agency (CEAA) and the Quebec Ministry of the Environment.

In addition to the federal-provincial EA, Gaz Métro et al. will be seeking a National Energy Board (NEB) certificate to construct and operate the LNG terminal and the interconnecting pipeline. An application to the NEB is expected in 2005.

Gaz Métro and Enbridge plan to fund the project together, while Gaz de France will arrange natural gas supplies and provide shipping support. The target markets for the LNG are largely Quebec and Ontario, with any excess destined for export to the US northeast. The facility is expected to be in commercial operation, with a send-out capacity of about 500 MMcf/d by late 2008.

- b. TransCanada / Petro-Canada Cacouna Energy Project (Gros Cacouna, Quebec)
(<http://www.energiecacouna.ca/en/index.html>)

TransCanada, in partnership with Petro-Canada, is proposing to construct a CDN \$660 million, 500

MMcf/d LNG import facility on the Saint Lawrence River, near Gros Cacouna, Quebec.

TransCanada would operate the LNG facility, while Petro-Canada would provide the necessary natural gas supplies. On October 12, 2004, Russian natural gas monopoly Gazprom and Petro-Canada signed a Memorandum of Understanding to investigate the possibility to jointly develop a liquefaction plant near St. Petersburg, Russia, which would bring LNG to the Gros Cacouna LNG facility by 2009.

From the facility, natural gas would be delivered via a new 240 kilometer pipeline to the existing natural gas pipeline infrastructure in Quebec. Quebec, Ontario and the US northeast are the anticipated markets for any LNG delivered to the Gros Cacouna facility.

The Cacouna Energy Project is subject to an EA under both the *CEAA* and the *Quebec Environment Act*. In September 2004, the proponents submitted a project description to CEAA and the Quebec Ministry of Environment. The EA / regulatory approval process is expected to take approximately two years. Provided the necessary approvals are received, it is expected the LNG facility will be in service by 2009.

Atlantic Canada

- a. Irving Oil Canaport LNG project (Saint John, New Brunswick)
(<http://www.irvingoil.com/>)

Irving Oil (Irving) plans to develop a CDN \$750 million, 1 billion cubic feet per day (Bcf/d), LNG import facility near its existing Canaport deepwater marine terminal in Saint John, New Brunswick. The Canaport terminal currently receives crude oil tankers from overseas in excess of 400,000 tonnes. The crude oil is delivered to Irving's Saint John refinery, the largest in Canada.

Irving's LNG project was subject to an EA under both the *CEAA* and the *New Brunswick's Clean Environment Act*. On August 6, 2004, Irving received federal and provincial EA approvals. Irving expects to obtain all the remaining federal and provincial permits, authorizations and approvals in time to begin construction by mid-2005. It is anticipated that the facility will be operational by late 2007.

In September 2004, Irving signed on Spanish energy company Repsol YPF SA (Repsol) to assist in developing its LNG terminal. Repsol, based in Madrid, is already one of the US' largest suppliers of LNG, but the Irving facility would be the first LNG receiving terminal on the continent in which Repsol would have an ownership stake.

Irving's LNG import facility would be located approximately 105 kilometres from the US border. A portion of the LNG will be sold into eastern Canada and Irving plans to consume some of the natural gas as fuel in its own nearby refinery. Additional volumes could be sold to local paper mills

and power plants. Excess natural gas could also be directed to the US northeast.

- b. Keltic Petrochemicals (Goldboro, Nova Scotia)
(<http://www.kelticpetrochemicals.ca/home.html>)

Halifax-based Keltic Petrochemicals (Keltic) is proposing to develop an integrated petrochemical and LNG facility in Goldboro, Nova Scotia. Keltic's integrated project consists of a petrochemical plant, an LNG re-gasification receiving terminal and natural gas storage facility, de-methanizing units, power generation up to 200 megawatts, as well as related utility and offsite infrastructure and systems.

Keltic's project is subject to an EA under both the *CEAA* and the *Nova Scotia Environment Act*. In August 2004, Keltic submitted a project description to the CEAA, which commenced the EA process. The environmental review is expected to take approximately one year. The complex is estimated to cost CDN \$4 billion and could be in operation by late 2008.

- c. Statia Terminals (Strait of Canso, Nova Scotia)
(<http://www.statiaterm.com/>)

Statia Terminals (Statia) of Nova Scotia has announced plans to construct and operate an LNG import facility at the Strait of Canso, Nova Scotia. Statia is already in the oil storage business at the Point Tupper industrial park and considers the importation of LNG as an extension of its current business. Statia's LNG proposal is in the early stages of development and has not yet entered the EA / regulatory review stage.

- d. Anadarko Petroleum Corporation Bear Head LNG project (Strait of Canso, Nova Scotia)
(<http://www.anadarko.com/>)

On August 12, 2004, US-based Anadarko Petroleum Corporation (Anadarko) acquired Access Northeast Energy Inc. (ANE), a private Canadian company whose sole project was its proposed LNG import facility at Bear Head, Nova Scotia. As a major US oil and natural gas producer with operations in North America, Qatar, Algeria, and Venezuela, Anadarko has access to natural gas supplies, which could be used to supply the LNG facility.

The LNG facility, which would have an initial send-out capacity of 1 Bcf/d, is expected to deliver natural gas to markets in Atlantic Canada and the US northeast. The estimated cost is between CDN \$400-500 million, depending on the final size of the LNG facility.

The project was subject to an EA under both the *CEAA* and the *Nova Scotia Environment Act*. On August 9, 2004, ANE secured federal-provincial EA approval. All remaining federal and provincial permits and approvals are expected in early 2005. The facility is expected to be in commercial operation by late 2007.

The table below provides a summary of the eight LNG import terminal projects being proposed for Canadian sites.

Projects Under Review					
Proponent(s) (Name)	Location	Cost (\$CDN)	Send-Out Capacity (Bcf/d)	Earliest Start Date	Status
Anadarko Petroleum Corporation (Bear Head)	Canso Strait, NS	\$400 - 500 million	1.00	2007	Received federal-provincial environmental assessment approval in August 2004.
Irving Oil Limited (Canaport)	Saint John, NB	\$750 million	1.00	2007	Received federal-provincial environmental assessment approval in August 2004.
Enbridge/Gaz Métro/Gaz de France (Rabaska)	Beaumont, QC	\$700 million	0.50	2008	Undergoing federal-provincial environmental assessment. Process commenced June 2004.
Keltic Petrochemicals	Goldboro, NS	\$4 billion ¹	0.50	2008	Undergoing federal-provincial environmental assessment. Process commenced August 2004.
Kitimat LNG	Kitimat, BC	\$300 million	0.61	2008	Undergoing federal-provincial environmental assessment. Process commenced August 2004.
TransCanada/Petro-Canada (Cacouna Energy Project)	Gros Cacouna, QC	\$660 million	0.50	2009	Undergoing federal-provincial environmental assessment. Process commenced September 2004.
Other Announced Projects					
Westpac Terminals	Prince Rupert, BC	\$200 million	0.30	2009	Project not yet under review.
Statia Terminals	Canso Strait, NS	Unknown	0.50	2009	Project not yet under review.
TOTAL CANADA			4.91		

Source: NPCA, industry press and company websites. Note: (1) Integrated petroleum refinery and LNG import terminal.

CONCLUSION

Both industry and government analysts project continued growth in North American demand for natural gas and a decreasing ability for domestic natural gas producers to meet that demand. Greater LNG imports represent one way to address this expected growth in demand.

In order to supply natural gas for Canadian needs, as well as to export additional supplies to the US, there are eight proposals to construct LNG import facilities in Canada. Before the end of this decade, it appears likely that the North American natural gas supply picture will include at least one or two Canadian LNG import facilities.