About LNG

What is LNG?

Liquefied Natural Gas (LNG) is natural gas that has been converted to a liquid form for storage or transportation. LNG is 1/600th the volume of natural gas in its gaseous state. Natural gas is converted to LNG by cooling to approximately -162 degrees Celsius. Once it is in liquid form it is transported on specially designed LNG carrier ships, and then re-gasified at destination.

LNG Plants Are Energy Intensive

LNG production and transportation is one of the most energy intensive industrial processes known. The cooling process requires enormous amounts of power. For example, the proposed LNG Canada Gas facility (Shell) in Kitimat will require approximately 1,200 megawatts of power. In comparison the rebuilt Rio Tinto/Alcan aluminum smelter will require approximately 900 MW of power, and the proposed Site C hydro project on the Peace River would produce 900 MW.

Cumulative Impacts

Approximately one dozen new LNG projects are now proposed in BC – with liquefaction facilities proposed for the coast, along with numerous pipelines to connect the Peace River Country with the Pacific. Thousands of new gas wells would be required in Northeast BC. A number of the largest energy companies in the world, including Chevron, Shell, PetroChina, Petronas, Apache and British Gas are scrambling to join the race to export LNG.

Each proposal is being developed and environmentally assessed in isolation from the other LNG proposals. No environmental assessments will be done on the thousands of gas wells. Assessments will proceed on individual LNG and pipeline projects - but there is no comprehensive assessment of the overall development being proposed. There is little capacity for citizens, communities, government or industry to consider the cumulative ecological and social impacts of the proposed LNG projects, especially in conjunction with other proposed major developments.

Want to learn more about LNG in Northwest BC?

Visit BCLNGinfo.com

Air quality and greenhouse gases

Kitimat has one of the most confined airsheds in the world and an increase in pollution associated with multiple industrial development proposals poses considerable risk. Nitrogen oxide (NOx), sulphur oxide (SOx), sulphur dioxide (SO2) and particulate matter are emitted during the liquefaction process. The life-cycle emissions of NOx from LNG could be greater than coal. With 3 liquefaction plants proposed for Kitimat, these associated emissions raise human heath concerns such as respiratory disease.

Much of the gas that would be used in proposed BC LNG plants will come from shale gas, an unconventional extraction process that produces significant GHG emissions. If powered by natural gas, LNG facilities will also produce considerable emissions. In 2012, the BC Government exempted LNG export facilities and electricity generation used to power them from the Clean Energy Act, which would have required them to be powered by clean and renewable energy.

When all the CO2 emissions associated with the proposed LNG projects are considered, there is almost no chance that BC could meet any of its stated greenhouse gas emission targets.

Fracking and Water

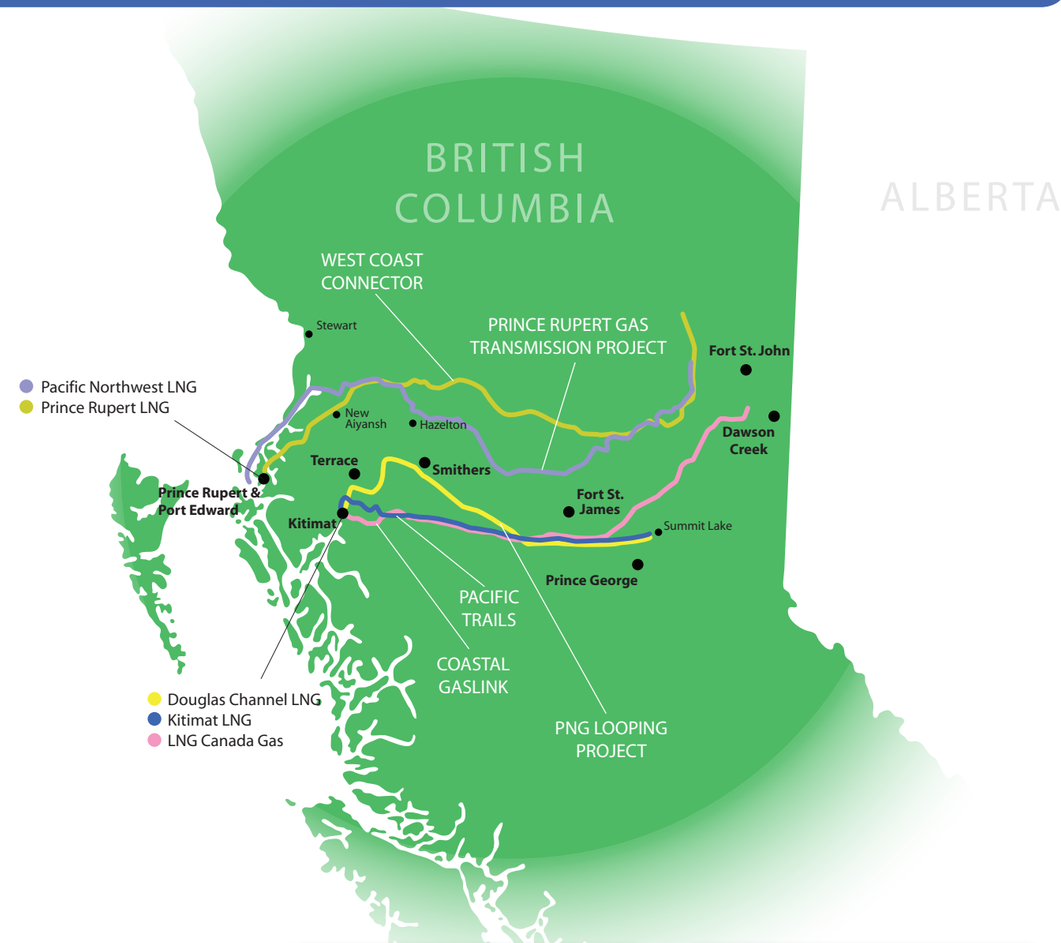
Extracting gas from shale in Northern BC requires hydraulic fracturing, or “fracking.” This is a process that involves injecting water and chemicals under high pressure into shale formations. Fracking uses enormous volumes of water, and impacts the quality of that water, and has other potential impacts.

Security of BC’s Gas Supply

The volume of gas required for the proposed LNG projects is immense. BC currently produces 3.0 billion cubic feet per day, of which nearly 60% is consumed in Canada. Just one of the current proposals – Shell’s LNG Canada Gas – has obtained an export license for 3.2 billion cubic feet per day. Under full-scale LNG development, as suggested by government, all known and projected natural gas reserves in BC would be gone in less than 100 years.

Canada holds just under 1% of natural gas reserves worldwide. Several of the proposed BC LNG projects would be the largest LNG facilities in the world.

Proposed LNG Projects in Northern B.C.



Other potential proponents

Triton LNG LP
Proponent(s): AltaGas Ltd/Idemitsu Kosan
Project: LNG facility at Kitimat or Pr. Rupert

Aurora LNG
Proponent(s): Nexen/INPEX/JGC Corp.
Project: LNG facility at Grassy Point

Woodside Petroleum
Project: LNG facility at Grassy Point

WCC LNG
Proponent(s): Imperial Oil/Exxon Mobil
Project: LNG facility at Grassy Point

Kitsault Energy
Project: LNG facility at Kitsault

SK E&S
Project: LNG facility at Grassy Point

Proposed Liquefied Natural Gas (LNG) Projects in Northern B.C.

LNG Name*	LNG Status	Partners	Location	Capacity billion cubic feet/day	In-Service Date	Peak Power Requirements	Tankers per year**	Pipeline Name	Pipeline Status	Pipeline Proponent	Pipeline Details	Gas Source
Douglas Channel LNG	EA: not required. Export license: approved Feb/2014 for 1.8 MTA (0.2 bcf/d). Take off agreements signed Jan/2013.	BC LNG Export Co-operative Haisla Nation/LNG Partners	Kitimat barge facility	0.09 - 0.11	2015	Unknown	Small: 12 - 15 Large: 6 - 7	Existing PNG pipeline and PNG Looping Project	EA not required for existing PNG pipeline. PNG Looping Project is pre-application under the BC EA process.	Pacific Northern Gas	Existing: 0.115bcf/d, 10" diameter. Looping project: 24" diameter, 525 km, 0.6 bcf/d.	
Kitimat LNG	EA: Complete under BC EA (2008). Export license: approved Oct/2011 for 10 MTA (1.3 bcf/d). No "Take Off" agreements.	Chevron/Apache 50/50 equity of LNG facility, pipeline, & upstream production	Bish Cove, Kitimat	0.6 - 1.3	2016	Unknown	Small: 80 - 172 Large: 40-86	Pacific Trail Pipelines	EA: Complete under BC EA (2008). EAO extended mandatory construction start from June/2013 to Sept/2018.	Chevron/Apache	42" diameter. 462 km. 1.0 Bcf/d. Summit Lake to Kitimat via Morice River.	Chevron/Apache holdings in Horn River and Liard Basins.
Prince Rupert LNG	EA: Pre-application under CEAA. Public comment period on issues to be considered closed July/2013. Export license: approved Dec/2013 for 21 MTA (2.7 bcf/d).	BG Group/Spectra Energy (50/50)	Ridley Island, Prince Rupert	1.8 - 2.7	2020	Approx. 600 MW	Small: 239 - 358 Large: 119 - 179	Westcoast Connector Gas Transmission Project	EA: Pre-Application under BC EA. Application Information Requirements approved by BCEAO May/2013.	Spectra	36"- 48" Diameter 870 km, 4.2 bcf/d. Up to 2 pipelines. Cypress to Ridley Island via Babine and Nass Valleys.	
LNG Canada Gas	EA: Pre-application under BC EA. Public comment period on draft Application Information Requirements closed Dec/2013. Export license: approved Feb /2013 for 24 MTA (3.1 bcf/d).	Shell/PetroChina/ Mitsubishi/Kogas	Kitimat	1.5 - 3.1	2018	Approx. 1200 MW	Small: 225 - 425 Large: 112 - 213	Coastal GasLink Pipeline Ltd.	EA: Pre-Application under BC EA. Application Information Requirements approved by BCEAO May/2013.	TransCanada	48" Diameter. 650 km. 1.7 - 5.0 bcf/d. Dawson Creek to Kitimat. Parallels most of PTP corridor except west of Burnie River.	
Pacific Northwest LNG	EA: Pre-application under BC EA. Public comment period on draft Application Information Requirements closed Dec/2013. Export license: approved Dec/2013 for 22 MTA (2.8 bcf/d).	Petronas/Japex/ Petroleum Brunei (87/10/3)	Lelu Island, Port Edward	1.5 - 2.3	2018	Approx. 700 MW	Small: 199 - 305 Large: 99 - 152	Prince Rupert Gas Transmission Project	EA: Pre-application under BCEA. Application Information Requirements approved by BCEAO Feb/2014.	TransCanada	48" diameter. Up to 900 km, 2 - 3.6 bcf/d. Hudson's Hope to Lelu Island near Port Edward. Proceeding with South Central Alternative route.	Progress' holdings in North Montney plus other.
Aurora LNG	Responded to BC Gv's EOI. Gained rights to sing long term tenure with Province of BC Nov/2013. Export license: application submitted Nov/2013 for 12 MTA (1.5 bcf/d)	Nexen/INPEX/JGC Corporation	Grassy Point	1.5 - 3.1	2020-2023	Unknown	Small: 225 - 425 Large: 112 - 213	TBA				
Triton LNG	Proposed. Export license: application submitted Oct/2013 for 2.3 MTA (0.3 bcf/d)	AltaGas Ltd/Idemitsu Kosan	Kitimat or Prince Rupert	0.3	2017	Unkown	Small: 40 Large: 20	PNG Looping Project (twinning of existing pipeline)	**Pre-application under BC EA. Public comment period on draft Application Information Requirements closed Jan/2014.**	Pacific Northern Gas	24" diameter 525 km 0.6 bcf/d Summit Lake to Kitimat	

* Four other potential proponents: WCC LNG proposed by Imperial Oil/Exxon Mobil (Location: Grassy Point; Capacity: up to 3.8 bcf/d); Woodside Petroleum (Location: Grassy Point; Capacity TBA); SK E&S (Location: Grassy Point; Capacity TBA); Kitsault Energy (Location: Kitsault; Capacity 2.6 bcf/d).
**Small tankers = 130,000 m^3 capacity; Large tankers = 260,000 m^3 capacity

Updated February 2014

NORTHWEST INSTITUTE FOR BIOREGIONAL RESEARCH