

From: Elise Lepine
To: [Clausen, Scott \(NRCan/RNCan\)](#)
Cc: [Zyzniewski, Anna \(NRCan/RNCan\)](#); [Hubbard, Terence \(NRCan/RNCan\)](#); [Turner, Geoff J. EMPR:EX](#); [Andre Powell](#)
Subject: Re: Fw: LNGC investments
Date: Wednesday, January 17, 2018 5:23:08 PM
Attachments: [Confirmation of figures.docx](#)

Hi Scott,

I've attached a word document with a description of what the number you send are plus updated estimates and details around those estimates. Likely LNGC sent you some figures from a slightly outdated presentation, some of these have been tightened up since then with refined inputs and assumptions.

Happy to have a call to discuss if you have any follow-up questions.

Regards,

Elise

On Wed, Jan 17, 2018 at 4:24 PM, Clausen, Scott (NRCan/RNCan) <scott.clausen@canada.ca> wrote:

Elise,

Thanks a million for helping us out. s.16,s.21
s.16,s.21

Important that we are as 100 percent accurate as we can be.

Thank you!

Scott

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Hubbard, Terence (NRCan/RNCan) <terence.hubbard@canada.ca>
Sent: Wednesday, January 17, 2018 6:51 PM
To: Zyzniewski, Anna (NRCan/RNCan); Clausen, Scott (NRCan/RNCan)
Subject: Re: LNGC investments

Thanks. s.13,s.16
s.13,s.16

Sent from my BlackBerry 10 smartphone on the Rogers network.

From: Zyzniewski, Anna (NRCan/RNCan)
Sent: Wednesday, January 17, 2018 6:09 PM
To: Hubbard, Terence (NRCan/RNCan); Clausen, Scott (NRCan/RNCan)
Subject: FW: LNGC investments

Hi Terry,

Scott may be driving. He said you were looking for these numbers.

Anna

From: Zyzniewski, Anna (NRCan/RNCan)
Sent: January 17, 2018 6:08 PM
To: Clausen, Scott (NRCan/RNCan) <scott.clausen@canada.ca>
Subject: LNGC investments

Hi Scott,

Here is the breakdown of LNGC investments across the value chain:

s.13,s.16,s.21

Anna

Senior LNG Policy and Market Analyst

Pipelines, Gas and LNG Division

Petroleum Resources Branch

Natural Resources Canada / Government of Canada

Anna.Zyzniewski@canada.ca / Tel.: 1-343-292-6217

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| Elise Lepine

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Asset Management



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s.13,s.16,s.21

Metcalfe, Megan EMPR:EX

From: Elise Lepine <elepine@deetken.com>
Sent: Wednesday, January 17, 2018 5:09 PM
To: Turner, Geoff J EMPR:EX
Cc: Andre Powell
Subject: Fwd: Fw: LNGC investments

Hi Geoff,

Just a heads up that Scott has contact me to confirm some numbers. I will cc you on my reply.

Regards,

Elise

----- Forwarded message -----

From: Clausen, Scott (NRCan/RNCan) <scott.clausen@canada.ca>
Date: Wed, Jan 17, 2018 at 4:24 PM
Subject: Fw: LNGC investments
To: Elise Lepine <elepine@deetken.com>
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Background Note

CLIFF: 139237

ISSUE: LNG Canada Project Profile

BACKGROUND:

- LNG Canada is a proposed four-train, 26 million tonnes per annum liquefaction project to be located near Kitimat. The current focus of the project is on the first phase, which consists of two trains totalling 13 million tonnes per annum of capacity. It has received environmental approval from both the provincial and federal government and is fully permitted – including the first LNG Facility Permit issued by the BC Oil and Gas Commission.
- The project was one of the earlier liquefied natural gas (LNG) projects proposed in British Columbia with pre-development activities starting in 2011 (the project was officially launched in May 2012). It is being developed by experienced partners including Shell (50%, operator) along with major LNG buyers PetroChina (20%), Mitsubishi (15%) and KOGAS (15%).
- LNG Canada will use shale gas from Western Canadian plays. Each project partner has acreage in Western Canada, with the largest positions in the Montney followed by the Horn River. Gas will be transported to Kitimat via TransCanada's proposed Coastal GasLink pipeline.
- Since its inception, market conditions have changed significantly and on July 11, 2016, LNG Canada announced that its joint venture partners had decided to delay a Final Investment Decision (FID) on the project to focus on reducing capital costs. Later that year the project announced that it would use this delay to undertake a new competitive process to identify a prime contractor to build their facility and related infrastructure. Recently, the LNG Canada CEO Andy Calitz announced that the project is "extremely active" and the consortium intends on taking a FID in 2018.
- Premier Horgan and Minister Mungall last met with the executive team from LNG Canada, on Tuesday, October 17, 2017.

KEY MESSAGES:

- LNG Canada remains a promising large-scale LNG export project in British Columbia.
- The project is fully permitted and was the first LNG export project to be issued a LNG Facility Permit by the BC Oil and Gas Commission.

- The Province continues to work with LNG Canada to advance the project.
- The Province is committed to working closely with First Nations on issues related to natural gas development and the building of an LNG industry.
- BC has multiple LNG proposals still on the table in BC, demonstrating a continued interest in our province's export potential.
- BC's new government supports LNG development – with four conditions:
 1. Proposals must include express guarantees of jobs and training opportunities for British Columbians;
 2. Proposals must provide a fair return for our resources;
 3. Proposals must respect and make partners of First Nations; and
 4. Proposals must protect our air, land and water, including living up to our climate commitments.
- The Ministry of Energy, Mines and Petroleum Resources has undertaken a consultation and review of BC's cost competitiveness and fiscal policies. This review involved industry, First Nations, the federal government and communities. The review will also examine ways to make LNG produced in BC in the most climate friendly way possible. The collaborative consultation concluded with a series of recommendations.

ATTACHMENTS: Attachment 1: LNG Project Fact Sheet

CONTACT:

Suzanne Manahan
Ministry of Energy, Mines and Petroleum Resources
A/ADM; 250-952-0729

Attachment 1

LNG Project Fact Sheet

LNG CANADA

August 2017

Recent Announcements

- Aug 23** The Globe and Mail reported that PETRONAS was considering acquiring a minority stake in LNG Canada.
- Aug 3** Andy Calitz, CEO of LNG Canada, announced that the project wants to make a Final Investment Decision and commence construction in 2018.
- July 6** LNG Canada announced that Servco Industrial Contractors Ltd in partnership with Haisla Nation will begin work on demolishing and removing the former methanol terminal infrastructure. Work is set to wrap up by the end of the year.
- Mar 30** The Province and the Kitselas First Nation reached new agreements to ensure the nation receives direct benefits when progress is made on the LNG Canada project.

Facility Concept



Major Permits and Authorizations

Export License:	40-year export license issued May 2016
Provincial Environmental Assessment Status:	EAC issued June 2015, amended August 2016
Federal Environmental Assessment Status:	EADS issued June 2015
LNG Facility Permit:	Issued January 2016

Summary Table

Shareholders:	Shell (50%), PetroChina (20%), KOGAS (15%), Mitsubishi (15%)	
Facility Type:	Liquefied Natural Gas Facility and Marine Terminal	
Location:	Kitimat - Former Methanex site	
Output Capacity	Initial:	13 MTPA
	Total:	26 MTPA
Feedstock Pipeline:	Coastal GasLink	
LNG Buyers:	Shareholders will offtake volumes in proportion to their equity stakes	
Pre-FEED Contractor:	Not announced	
FEED Contractor:	CFSW LNG Constructors (Chiyoda, Foster Wheeler, SAIPEM and Worley Parsons)	
EPC Contractor:	Not announced	
Capital Expenditure (est.):	\$25-\$40 billion	
Operating Expenditure (est.):	\$7-\$17 billion per year	
Construction Jobs (est.):	4,500 to 7,500 expected at the height of construction	
Operations Jobs (est.):	300 to 450 people during initial phase, increasing to 450-800 at full capacity	

Contact: Oil and Gas Division

From: [Turner, Geoff J EMPR:EX](#)
To: [Lucas, Jennifer GCPE:EX](#)
Subject: IN_LNG Industry Status_Feb 06 2018_DRAFT.docx
Date: Wednesday, February 7, 2018 11:12:29 AM
Attachments: [IN_LNG Industry Status_Feb 06 2018_DRAFT.docx](#)

Let me know if you have any questions.

Thank

Geoff

<p style="text-align: center;">CONFIDENTIAL GCPE-MEMPR ISSUE NOTE</p> <p>Ministry of Energy, Mines and Petroleum Resources Date: February 6, 2018 Minister Responsible: Hon. Michelle Mungall</p>	<p style="text-align: center;">LNG Industry Status</p>
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ADVICE AND RECOMMENDED RESPONSE:

- **We are focused on creating an economy that works for everyone – with good, high-paying jobs across the province.**
- **The LNG industry can play a role, and our government supports the industry – with four conditions:**
 - 1. LNG projects must offer jobs and training for British Columbians, especially jobs for local people.**
 - 2. The people of B.C. must get a fair return for our resources.**
 - 3. LNG projects must secure full partnerships with local First Nations.**
 - 4. LNG projects must complete a made-in-B.C. environmental assessment and respect our commitments to combating climate change.**
- **Multiple LNG proposals on the table in British Columbia, demonstrates a continued interest in our province’s export potential.**
- **Exporting natural gas to new, global markets remains a long-term endeavor and we will continue to evaluate how government best supports the industry’s growth and competitiveness while at the same time respecting our environment.**

Communications Contact: Jennifer Lucas 778 968-3208
Darren Beaupre 250 356-5892
Program Area Contact: Geoff Turner, 778 698-3700
File Created: August 28, 2017
File Updated: February 6, 2018

Updated August 18, 2017

PROPOSED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	<u>Environmental Assessment</u>			LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEAA, NEB Application or Stated Publicly</u>		STATUS
				NEB Export Approval	Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
KITIMAT LNG	Woodside (50%), Chevron Canada (50%)	Kitimat	s.21	✓	✓	✓	Pre-Application	s.21	Construction: 3,000 at peak activity Operational: 150	During a presentation to the Kitimat municipal council, commercial manager Fred Eastwood stated that construction could begin by the year 2020, and the project would require between 4 and 5 years to be built.
LNG CANADA	Shell (50%), KOGAS (15%), Mitsubishi (15%), PetroChina (20%)	Kitimat	Initial Capacity: 13 MTPA Full Capacity: 26 MTPA	✓	✓	✓	✓	\$25 - \$40 billion at full build-out	Construction: 4,500 – 7,500 (peak volume) Operational: 300-450 (full operational)	Undertaking a competitive process to identify a Construction Contractor (December 2016)
WOODFIBRE LNG	Pacific Oil and Gas	Squamish	2.1 MTPA	✓	✓	✓	Pre-Application	\$1.6 billion	Construction: 650. Operational: Approx. 100.	40-year export licence issued by NEB (June 2017)

PROPOSED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	NEB Export Approval	<u>Environmental Assessment</u>		LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEAA, NEB Application or Stated Publicly</u>		STATUS
					Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
WCC LNG Ltd.	Imperial Oil and ExxonMobil Canada Ltd.	Prince Rupert (Tuck Inlet)	Initial Capacity: 15 MTPA Full Capacity: 30 MTPA	✓	Pre-Application		Pre-Application	\$15-\$25 Billion	Construction: 1,000 to 6,000 workers Operations: 250-300 people	40-year export licence issued by NEB October 26, 2016
WESPAC LNG	Wespac Midstream	Delta	3 MTPA	✓	Pre-Application		N/A	\$175 million (Jetty)	Construction: Approx. 131.5 person-years. Operational: Approx. 19 fulltime equivalent.	AIR approved by EAO November 2016 LNG sourced from the Tilbury LNG Plant owned by FortisBC Energy, Inc.
Sarita LNG	Steelhead LNG Inc.	Sarita Bay (near Port Alberni)	24 MTPA	✓	Not Submitted		Not Submitted	\$30 billion	Not yet announced	Huu-ay-aht citizens voted to approve the co-management of the Sarita LNG facility (March 2017)
DISCOVERY LNG	Rockyview Resources Inc.	Campbell River	20 MTPA	✓	Not Submitted	Not Submitted	Not yet announced	Not yet announced	Not yet announced	New ownership group announced March 2016
ORCA LNG	Orca LNG Ltd.	Prince Rupert	24 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016

PROPOSED LNG EXPORT FACILITIES

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					Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
CEDAR LNG	Cedar LNG Export Development Ltd. (owned by the Haisla Nation)	Douglas Channel, Haisla project lands	6.4 MTPA	✓	Not Submitted		Not Submitted	Not yet available	Not yet announced	Export licence issued May 2016
NewTimes Energy	NewTimes Energy Ltd.	Prince Rupert	12 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016
STEWART ENERGY LNG	Canada Stewart Energy Group Ltd.	Stewart	30 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016
KITSAULT ENERGY	Kitsault Energy Ltd.	Kitsault	20 MTPA	✓	Not Submitted	Not Submitted	Not yet announced	Not yet announced	Not yet announced	Export license issued (May 2016)
Nisga'a LNG	Nisga'a Nation	Nasoga Gulf		Not Submitted	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Seeking investors

CANCELLED/SUSPENDED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	<u>Environmental Assessment</u>			LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEEA, NEB Application or Stated Publicly</u>		STATUS
				NEB Export Approval	Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
DOUGLAS CHANNEL LNG	AIJVLP (a limited partnership between AltaGas Ltd. and Idemitsu Kosan Co. Ltd.), EDFT Trading, EXMAR	Kitimat	Initial Capacity: 0.55 MTPA Full Capacity: 7.6 MTPA	✓		n/a	Not Submitted	US\$300 million ¹ (floating facility) US \$600 million (full project)	Not yet announced	Project development halted in March 2016
PACIFIC NORTHWEST LNG	PETRONAS (62%), JAPEX (10%), PetroleumBRUNEI (3%), Indian Oil (10%), Sinopec (10%), Huadian (5%)	Prince Rupert	Initial Capacity: 12 MTPA Full Capacity: 18 MTPA	✓	✓	✓	✓	\$11 billion (facility)	Construction: 3,500 (peak) Operational: Up to 520	On July 25, 2017 Pacific NorthWest LNG announced that the LNG project not proceed as previously planned.
TRITON LNG	AltaGas Ltd. and Idemitsu Canada Corp	TBD: Kitimat or Prince Rupert	2.3 MTPA	✓		Not Submitted	Not Submitted	Not yet announced	Not yet announced	Project suspended May 2016

¹ Publicly disclosed at the 2015 LNG in BC conference and quoted in a Business Vancouver Article (<https://www.biv.com/article/2015/10/offshore-lng-infrastructure-facing-heavy-duty-fees/>)

CANCELLED/SUSPENDED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	<u>Environmental Assessment</u>			LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEAA, NEB Application or Stated Publicly</u>		STATUS
				NEB Export Approval	Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
PRINCE RUPERT LNG	Shell	Prince Rupert	Initial Capacity: 14 MTPA Full Capacity: 21 MTPA	✓	Pre-Application		Pre-Application	\$11 billion Phase One \$5 billion Phase Two	Phase One: 9,000 person-years 1 Phase Two: 3,500 person-years Operational: 250 FTE's after phase 2 complete	Shell announced that the development of Prince Rupert LNG will be discontinued on March 10, 2017
AURORA LNG	Nexen Energy (subsidiary of CNOOC Ltd.), INPEX Corp and JGC Corp	Digby Island	Initial Capacity: 12 MTPA Full Capacity: 24 MTPA	✓	Under Review		Pre-Application	\$28 billion	Construction: 5,000 (Phase 1 peak) Operations: 860	Cancellation announced Sept 14, 2017
Malahat LNG	Steelhead LNG Inc.	Bamberton	6 MTPA				Not Submitted			Cancelled December 2017

s.21

DOMESTIC LNG FACILITIES

PROJECT	Proponent	LOCATION	Size		From Project Descriptions Filed with EAO and CEEA, or Stated Publicly		NOTES
			Liquefaction	Storage	ESTIMATED CAPEX	ESTIMATED JOBS	
Regional LNG	AltaGas	Dawson Creek	Initial Phase: 30,000 gallons/day (0.017 MTPA) Full Project: 500,000 gallons/day (0.283 MTPA)	N/A	Full Project: \$250 million	Not announced	Have received Leave to Construct permit from OGC Letter of intent signed with the Province (June 2014)
Ferus	Ferus Natural Gas Fuels Inc.	Fort Nelson (vicinity)	Initial Phase: 300,000 gallons/day (0.17 MTPA) Full Project: 600,000 gallons/day (0.34 MTPA)	N/A	Not Announced	Not Announced	Announced MOU with Casino Mining Corporation and Selwyn Chihong Mining Ltd. for LNG supply (Sept. 2016)
KT Energy	Kai Tian Energy Group	Fort Nelson (vicinity)	Initial Phase: 20,000 gallons/day (0.011 MTPA) Full Project: 60,000 gallons/day (0.033 MTPA)	N/A	Not Announced	Not Announced	Project issued LNG facility permit by BCOGC
Mt. Hayes Storage Facility	FortisBC	Ladysmith	0.0075 Bcf/d (0.06 MTPA)	1.5 Bcf or 1,500,000 GJ or 0.03 million tonnes	\$165 million	840 person-years of employment	Commenced operations in 2011

DOMESTIC LNG FACILITIES

PROJECT	Proponent	LOCATION	Size		From Project Descriptions Filed with EAO and CEAA, or Stated Publicly		NOTES
			Liquefaction	Storage	ESTIMATED CAPEX	ESTIMATED JOBS	
Tilbury LNG	FortisBC	Tilbury Island in Delta	Current: 5,000 GJ/day or 0.005 Bcf/d (0.04 MTPA) Total with Expansion: 39,000 GJ/day or 0.04 Bcf/d (0.28 MTPA)	Current: 0.6 Bcf or 600,000 GJ or 0.01 million tonnes Total with Expansion: 1.7 Bcf or 1,700,000 GJ or 0.03 million tonnes	\$60 million committed in local contractor spending	870 tradespeople registered for work on the expansion project	In March 2017 it was announced that the project was about 85 per cent complete with the target to be operating by the summer

PIPELINES FOR LNG EXPORT FACILITIES

PROJECT	RELATED FACILITY	LOCATION	DIAMETER	Provincial EAC	Capacity	<u>From Project Descriptions Filed with EAO and CEEA, or Stated Publicly</u>		NOTES
						ESTIMATED CAPEX	ESTIMATED JOBS	
Coastal GasLink (TransCanada)	LNG Canada	Groundbirch (approximately 40 km west of Dawson Creek) to Kitimat (650 km)	1219 mm (48 inches)	✓	2-3 Bcf/d of initial capacity (expansion up to 5bcf/d)	\$4 bn	Peak Construction: 2,000 - 2,500 jobs Operation: 15 to 20 jobs	Received the last two of 10 pipeline and facilities permits in May 2016.
Eagle Mountain – Woodfibre Gas Pipeline (FortisBC)	Woodfibre LNG	Coquitlam to Woodfibre facility (47 km)	609.6 mm (24 inches)	✓	228 million standard cubic feet per day (MMscfd)	\$520 million (of which 81% will be spent in Canada) over 3 year (2014-2017) period	Construction: 600 jobs Operations: 20 jobs	Environmental Assessment Certificate issued August 9, 2016
Island Gas Connector (Williams)	Malahat LNG	Sumas and Cherry Point, Washington, to Malahat LNG (128 km)		Not submitted				Related Facility canceled Dec 2017.
Pacific Northern Gas Looping Project (Pacific Northern Gas)	Triton LNG	Summit Lake to Kitimat (525 km)	610 millimetres (24 inches)	Pre-Application	0.6 Bcf/d	\$1.3 bn	Construction: 1800-2400 person years	Looping of current pipeline system

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						ESTIMATED CAPEX	ESTIMATED JOBS	
Pacific Trail Pipelines (Woodside & Chevron)	Kitimat LNG	Summit Lake to Kitimat (463 km)	1066.8 millimetres (42 inches)	✓	1 Bcf/d	\$1.5 bn	Peak Construction: 1500 jobs	On December 19, 2016 the EAO determined that the Pacific Trails Pipeline Project had been substantially started and the EA certificate will remain in effect for the life of the project.
Prince Rupert Gas Transmission (TransCanada)	Pacific NorthWest LNG	Hudson's Hope to Port Edward (750 km)	1,219 millimetres (48 inches)	✓	2 Bcf/d (potential expansion up to 3.6 bcf/d)	\$5 bn	Construction: 3,370 jobs Operations: 23 jobs	Related facility cancelled.
Westcoast Connector Gas Transmission (Enbridge)	Prince Rupert LNG	Cypress to Ridley Island near Prince Rupert (854 to 862 km)	Terrestrial section 1,219 mm (48 inch), marine section 1,067mm (42 inch)	✓	4.2 Bcf/d (8.4 Bcf/d if twinned)	\$7.5 bn (\$2.0 bn for operation)	Construction: 13,377 person years Operations: 5,947 person years	Related facility cancelled.

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To: [Lucas, Jennifer GCPE:EX](#)
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s.13

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Darren Beaupre 250 356-5892
Program Area Contact: Geoff Turner, 778 698-3700
File Created: August 28, 2017
File Updated: February 6, 2018

Updated February 7, 2018

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					Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
WCC LNG Ltd.	Imperial Oil and ExxonMobil Canada Ltd.	Prince Rupert (Tuck Inlet)	Initial Capacity: 15 MTPA Full Capacity: 30 MTPA	✓	Pre-Application		Pre-Application	\$15-\$25 Billion	Construction: 1,000 to 6,000 workers Operations: 250-300 people	40-year export licence issued by NEB October 26, 2016
WESPAC LNG	Wespac Midstream	Delta	3 MTPA	✓	Pre-Application		N/A	\$175 million (Jetty)	Construction: Approx. 131.5 person-years. Operational: Approx. 19 fulltime equivalent.	AIR approved by EAO November 2016 LNG sourced from the Tilbury LNG Plant owned by FortisBC Energy, Inc.
Sarita LNG	Steelhead LNG Inc.	Sarita Bay (near Port Alberni)	24 MTPA	✓	Not Submitted		Not Submitted	\$30 billion	Not yet announced	Huu-ay-aht citizens voted to approve the co-management of the Sarita LNG facility (March 2017)
DISCOVERY LNG	Rockyview Resources Inc.	Campbell River	20 MTPA	✓	Not Submitted	Not Submitted	Not yet announced	Not yet announced	Not yet announced	New ownership group announced March 2016
ORCA LNG	Orca LNG Ltd.	Prince Rupert	24 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016

PROPOSED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	NEB Export Approval	<u>Environmental Assessment</u>		LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEAA, NEB Application or Stated Publicly</u>		STATUS
					Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
CEDAR LNG	Cedar LNG Export Development Ltd. (owned by the Haisla Nation)	Douglas Channel, Haisla project lands	6.4 MTPA	✓	Not Submitted		Not Submitted	Not yet available	Not yet announced	Export licence issued May 2016
NewTimes Energy	NewTimes Energy Ltd.	Prince Rupert	12 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016
STEWART ENERGY LNG	Canada Stewart Energy Group Ltd.	Stewart	30 MTPA	✓	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Export licence issued May 2016
KITSAULT ENERGY	Kitsault Energy Ltd.	Kitsault	20 MTPA	✓	Not Submitted	Not Submitted	Not yet announced	Not yet announced	Not yet announced	Export license issued (May 2016)
Nisga'a LNG	Nisga'a Nation	Nasoga Gulf		Not Submitted	Not Submitted		Not Submitted	Not yet announced	Not yet announced	Seeking investors

CANCELLED/SUSPENDED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	<u>Environmental Assessment</u>			LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEEA, NEB Application or Stated Publicly</u>		STATUS
				NEB Export Approval	Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
DOUGLAS CHANNEL LNG	AIJVLP (a limited partnership between AltaGas Ltd. and Idemitsu Kosan Co. Ltd.), EDFT Trading, EXMAR	Kitimat	Initial Capacity: 0.55 MTPA Full Capacity: 7.6 MTPA	✓		n/a	Not Submitted	US\$300 million ¹ (floating facility) US \$600 million (full project)	Not yet announced	Project development halted in March 2016
PACIFIC NORTHWEST LNG	PETRONAS (62%), JAPEX (10%), PetroleumBRUNEI (3%), Indian Oil (10%), Sinopec (10%), Huadian (5%)	Prince Rupert	Initial Capacity: 12 MTPA Full Capacity: 18 MTPA	✓	✓	✓	✓	\$11 billion (facility)	Construction: 3,500 (peak) Operational: Up to 520	On July 25, 2017 Pacific NorthWest LNG announced that the LNG project not proceed as previously planned.
TRITON LNG	AltaGas Ltd. and Idemitsu Canada Corp	TBD: Kitimat or Prince Rupert	2.3 MTPA	✓		Not Submitted	Not Submitted	Not yet announced	Not yet announced	Project suspended May 2016

¹ Publicly disclosed at the 2015 LNG in BC conference and quoted in a Business Vancouver Article (<https://www.biv.com/article/2015/10/offshore-lng-infrastructure-facing-heavy-duty-fees/>)

CANCELLED/SUSPENDED LNG EXPORT FACILITIES

PROJECT	PROPONENT	LOCATION	SIZE	<u>Environmental Assessment</u>			LNG Facility Permit	<u>From Project Descriptions Filed with EAO and CEEA, NEB Application or Stated Publicly</u>		STATUS
				NEB Export Approval	Provincial	Federal		ESTIMATED INVESTMENT	ESTIMATED JOBS	
PRINCE RUPERT LNG	Shell	Prince Rupert	Initial Capacity: 14 MTPA Full Capacity: 21 MTPA	✓	Pre-Application		Pre-Application	\$11 billion Phase One \$5 billion Phase Two	Phase One: 9,000 person-years 1 Phase Two: 3,500 person-years Operational: 250 FTE's after phase 2 complete	Shell announced that the development of Prince Rupert LNG will be discontinued on March 10, 2017
AURORA LNG	Nexen Energy (subsidiary of CNOOC Ltd.), INPEX Corp and JGC Corp	Digby Island	Initial Capacity: 12 MTPA Full Capacity: 24 MTPA	✓	Under Review		Pre-Application	\$28 billion	Construction: 5,000 (Phase 1 peak) Operations: 860	Cancellation announced Sept 14, 2017
Malahat LNG	Steelhead LNG Inc.	Bamberton	6 MTPA				Not Submitted			Cancelled December 2017

s.21

DOMESTIC LNG FACILITIES

PROJECT	Proponent	LOCATION	Size		From Project Descriptions Filed with EAO and CEEA, or Stated Publicly		NOTES
			Liquefaction	Storage	ESTIMATED CAPEX	ESTIMATED JOBS	
Regional LNG	AltaGas	Dawson Creek	Initial Phase: 30,000 gallons/day (0.017 MTPA) Full Project: 500,000 gallons/day (0.283 MTPA)	N/A	Full Project: \$250 million	Not announced	Have received Leave to Construct permit from OGC Letter of intent signed with the Province (June 2014)
Ferus	Ferus Natural Gas Fuels Inc.	Fort Nelson (vicinity)	Initial Phase: 300,000 gallons/day (0.17 MTPA) Full Project: 600,000 gallons/day (0.34 MTPA)	N/A	Not Announced	Not Announced	Announced MOU with Casino Mining Corporation and Selwyn Chihong Mining Ltd. for LNG supply (Sept. 2016)
KT Energy	Kai Tian Energy Group	Fort Nelson (vicinity)	Initial Phase: 20,000 gallons/day (0.011 MTPA) Full Project: 60,000 gallons/day (0.033 MTPA)	N/A	Not Announced	Not Announced	Project issued LNG facility permit by BCOGC
Mt. Hayes Storage Facility	FortisBC	Ladysmith	0.0075 Bcf/d (0.06 MTPA)	1.5 Bcf or 1,500,000 GJ or 0.03 million tonnes	\$165 million	840 person-years of employment	Commenced operations in 2011

DOMESTIC LNG FACILITIES

PROJECT	Proponent	LOCATION	Size		From Project Descriptions Filed with EAO and CEAA, or Stated Publicly		NOTES
			Liquefaction	Storage	ESTIMATED CAPEX	ESTIMATED JOBS	
Tilbury LNG	FortisBC	Tilbury Island in Delta	Current: 5,000 GJ/day or 0.005 Bcf/d (0.04 MTPA) Total with Expansion: 39,000 GJ/day or 0.04 Bcf/d (0.28 MTPA)	Current: 0.6 Bcf or 600,000 GJ or 0.01 million tonnes Total with Expansion: 1.7 Bcf or 1,700,000 GJ or 0.03 million tonnes	\$60 million committed in local contractor spending	870 tradespeople registered for work on the expansion project	In March 2017 it was announced that the project was about 85 per cent complete with the target to be operating by the summer

PIPELINES FOR LNG EXPORT FACILITIES

PROJECT	RELATED FACILITY	LOCATION	DIAMETER	Provincial EAC	Capacity	<u>From Project Descriptions Filed with EAO and CEEA, or Stated Publicly</u>		NOTES
						ESTIMATED CAPEX	ESTIMATED JOBS	
Coastal GasLink (TransCanada)	LNG Canada	Groundbirch (approximately 40 km west of Dawson Creek) to Kitimat (650 km)	1219 mm (48 inches)	✓	2-3 Bcf/d of initial capacity (expansion up to 5bcf/d)	\$4 bn	Peak Construction: 2,000 - 2,500 jobs Operation: 15 to 20 jobs	Received the last two of 10 pipeline and facilities permits in May 2016.
Eagle Mountain – Woodfibre Gas Pipeline (FortisBC)	Woodfibre LNG	Coquitlam to Woodfibre facility (47 km)	609.6 mm (24 inches)	✓	228 million standard cubic feet per day (MMscfd)	\$520 million (of which 81% will be spent in Canada) over 3 year (2014-2017) period	Construction: 600 jobs Operations: 20 jobs	Environmental Assessment Certificate issued August 9, 2016
Island Gas Connector (Williams)	Malahat LNG	Sumas and Cherry Point, Washington, to Malahat LNG (128 km)		Not submitted				Related Facility canceled Dec 2017.
Pacific Northern Gas Looping Project (Pacific Northern Gas)	Triton LNG	Summit Lake to Kitimat (525 km)	610 millimetres (24 inches)	Pre-Application	0.6 Bcf/d	\$1.3 bn	Construction: 1800-2400 person years	Looping of current pipeline system

PIPELINES FOR LNG EXPORT FACILITIES

PROJECT	RELATED FACILITY	LOCATION	DIAMETER	Provincial EAC	Capacity	From Project Descriptions Filed with EAO and CEEA, or Stated Publicly		NOTES
						ESTIMATED CAPEX	ESTIMATED JOBS	
Pacific Trail Pipelines (Woodside & Chevron)	Kitimat LNG	Summit Lake to Kitimat (463 km)	1066.8 millimetres (42 inches)	✓	1 Bcf/d	\$1.5 bn	Peak Construction: 1500 jobs	On December 19, 2016 the EAO determined that the Pacific Trails Pipeline Project had been substantially started and the EA certificate will remain in effect for the life of the project.
Prince Rupert Gas Transmission (TransCanada)	Pacific NorthWest LNG	Hudson's Hope to Port Edward (750 km)	1,219 millimetres (48 inches)	✓	2 Bcf/d (potential expansion up to 3.6 bcf/d)	\$5 bn	Construction: 3,370 jobs Operations: 23 jobs	Related facility cancelled.
Westcoast Connector Gas Transmission (Enbridge)	Prince Rupert LNG	Cypress to Ridley Island near Prince Rupert (854 to 862 km)	Terrestrial section 1,219 mm (48 inch), marine section 1,067mm (42 inch)	✓	4.2 Bcf/d (8.4 Bcf/d if twinned)	\$7.5 bn (\$2.0 bn for operation)	Construction: 13,377 person years Operations: 5,947 person years	Related facility cancelled.

From: [Turner, Geoff J EMPR:EX](#)
To: [Humber, Emmy EMPR:EX](#)
Subject: RE: LNG Canada numbers
Date: Tuesday, March 6, 2018 1:24:40 PM

Hi Emmy,
s.13,s.17,s.21

Thanks
Geoff

From: Humber, Emmy MNGD:EX
Sent: Tuesday, March 6, 2018 1:20 PM
To: Turner, Geoff J MNGD:EX
Subject: LNG Canada numbers

Hi Geoff,

Simon and I have a briefing at PO at 3pm that I'm tweaking a deck for. We have total \$B project value for TransCanada but not LNG Canada. Do you have that information? Thanks,

Emmy Humber

Senior Advisor,

Strategic and Indigenous Affairs Division

Ministry of Energy, Mines and Petroleum Resources

Office: 778-698-7101

Mobile: 250-216-0874

Agenda: Assumptions Review and Verification Meeting

Location: LNG Canada, Suite 3113, Three Bentall Centre 595 Burrard Street, Vancouver

Attendees:

LNG Canada:

- TBC

BC Ministry of Finance

- Doug Foster
- Paul Flanagan
- Aaron Nelson

BC Ministry of Energy, Mines and Petroleum Resources

- Geoff Turner
- Mark Urwin

Deetken Group:

- Andre Powell
- Elise Lepine

Welcome and introductions: All

800 - 810

Purpose of the discussions: Geoff

810 - 820

- Opportunity for provincial representatives not directly involved in the development of the joint model to better understand the basis for assumptions incorporated into it
- Due diligence by the Province through access to internal LNG Canada financial and other business information related to the project costs to ensure that this information is consistent with the analysis contained in the joint model and used in the development of fiscal levers under consideration by the Province
- Review/update of joint model to account for any changes identified during the due diligence discussion and to refine the fiscal levers based on provincial analysis of how they could be implemented

Basis on which the information is being provided: Frederik

820-830

s.17,s.21

- Confidential and covered under NDA
- Represents LNG Canada working assumptions as of DATE
- Does not reflect ongoing discussions with EPC contractors
- Any other qualifications to be noted

Assumptions Discussion and Confirmation: All

830-1100

Discussion Topics

Construction Phase/Capital Cost

- Confirm project scope s.17,s.21

- Confirm project capital costs
- Confirm treatment of sunk costs (included or excluded from the total project cost)
- Confirm expected useful life of project – what is the potential for a longer life?
- Confirm proportion of labour cost as component of total construction costs
- Confirm capital cost of Coastal Gaslink
- Confirm modeled sustaining capital – what does this cover?
- What is the capitalization policy for the project?

Operating Cost

- Confirm expected LNG facility fuel gas requirements
- Confirm expected electricity load s.17,s.21
- Coastal Gaslink tolling structure
- Is there an expectation that shipping rates would decline given the expected increase in shipping capacity
- What is the plan for NGL's recovered at LNG facility – what volumes are expected

Model Assumptions s.17,s.21

- Exchange rate
- Inflation —
- Gas cost

Other Questions

- Are projected expansions included in the evaluation or is the decision to proceed based solely on the initial phase of the project?
- What is the project hurdle rate?
- How are projects different regions evaluated against each other? For example are different discount rates used for different projects (e.g., brownfield vs greenfield, tolling vs integrated)? How are project risks accounted for (i.e. does a lower risk require a lower hurdle rate)
- How is LNG sold? Do LNG marketers assume the risk between the LNG facility outlet and the purchaser or does LNG Canada intend to sell LNG at destination and assume shipping risk?
- Are there any assumptions around improving technology that either increase throughput or decrease costs over the life of the project?
- Are there any other material aspects of the project we should discuss today?

Review of Deetken Model: Andre and Elise 11-130

- Assumptions update (if needed)
- Levers review

Next Steps: All 130- 200

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