



Canada and the Natural Gas Economy

Special Report 1 | August 2019

# LNG: CANADA'S GLOBAL MARKET OPPORTUNITY

Global Market Demand and Canadian Production



Daily Oil Bulletin

**Evaluate**  
Energy

# CONTENTS

<b>03</b>	Introduction
<b>05</b>	The natural gas supply picture
<b>08</b>	Natural gas demand
<b>11</b>	LNG: Canada's global market opportunity
<b>14</b>	Analysis: Canada entering competitive LNG marketplace
<b>16</b>	Next "wave" essentials
	<b>Reference Material</b>
<b>17</b>	Key Canadian LNG Projects
<b>19</b>	Glossary & Conversions
<b>19</b>	Web Resources

# INTRODUCTION

Natural gas is enjoying a renaissance around the world. Consumption and production of natural gas was up over five per cent in 2018, one of the strongest rates of growth for both demand and output for over 30 years.<sup>1</sup>

And the outlook for natural gas uses remains promising. While natural gas demand in the past was driven by power generation — displacing more carbon-intensive energy sources such as coal and oil — in the future the demand will come from industrial applications and petrochemicals.

Canada has a tremendous opportunity to supply large populations with cleaner burning natural gas. The country's operators produce more gas than is needed for domestic markets. That excess gas production has traditionally been exported by pipeline to the U.S., but the shale gas revolution south of the border has led to reduced demand as that country moved from needing to import gas to exporting it, via a handful of LNG export projects.

As a result, production in Western Canada had declined in the past decade to about 16 billion cubic

feet per day (bcf/d) from 18 bcf/d, with prices collapsing. These shifting supply/demand market dynamics in North America have also sparked interest by Canadian producers in developing their own LNG exports.

Alberta and British Columbia fields have generations' worth of abundant natural gas. LNG projects are absolutely essential for Canadian natural gas producers to reach new markets, diversify the natural gas sector and create new employment opportunities.

In October 2018, LNG Canada announced a positive final investment decision (FID) for its proposed export project in Kitimat, B.C. This major infrastructure project is backed heavily by Royal Dutch Shell to supply LNG to Asian markets. More positive FIDs are expected on both coasts.

Canadian LNG developers have many advantages, including access to large and low cost gas supplies, as well as faster access to Asian and other markets than U.S. Gulf Coast LNG plants. There is also the potential to produce LNG

with the lowest GHG emissions in the world, especially in B.C., where most of the province's power is generated by hydro. But Canada must also address current disadvantages — in particular, regulatory issues and the lack of certainty in the overall investment climate for energy projects in the country.

This report examines how Canadian gas supplies — delivered to worldwide markets through LNG export terminals on the West Coast and the East Coast — can help meet burgeoning market demand and offer a transformative opportunity for struggling producers.

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**LNG projects are absolutely essential for Canadian natural gas producers to reach new markets, diversify the natural gas sector and create new employment opportunities.**

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<sup>1</sup> BP Statistical Review of World Energy – 2019 edition





*An artist's rendering of the LNG Canada project at full build out. Image courtesy LNG Canada*



# THE NATURAL GAS SUPPLY PICTURE

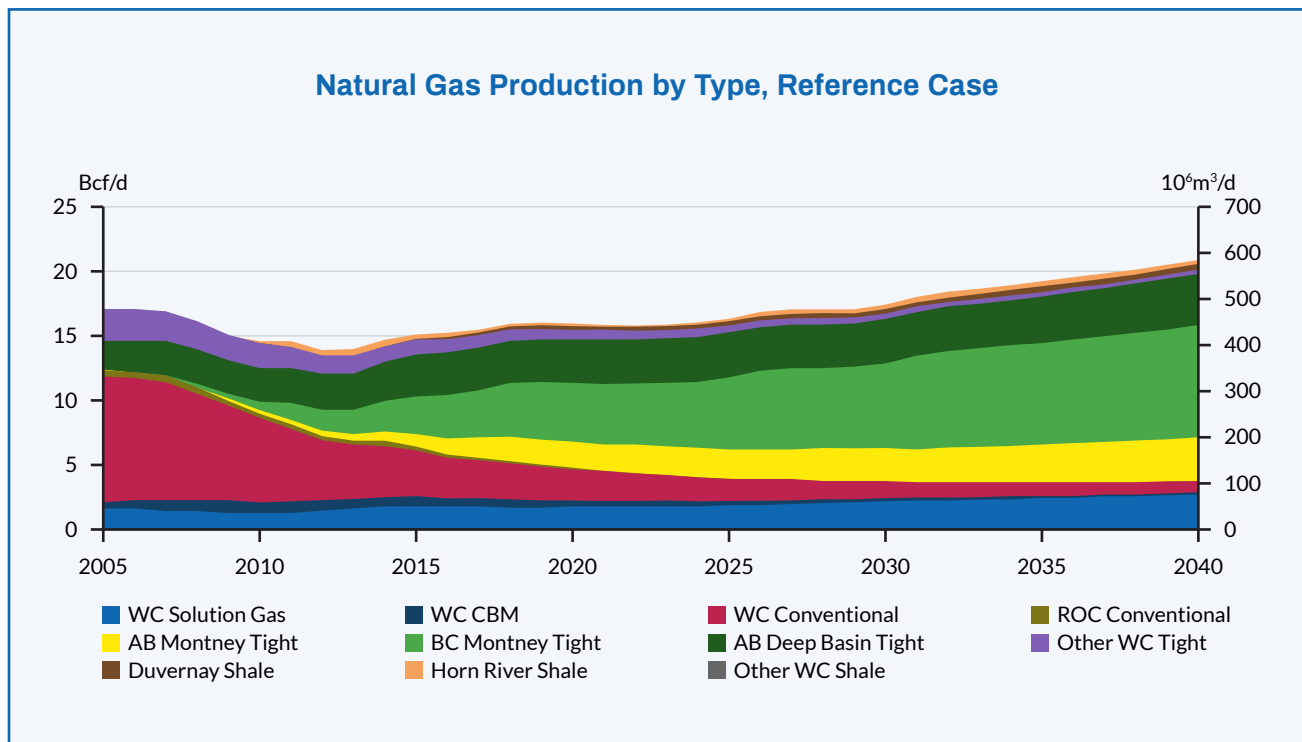
## CANADIAN NATURAL GAS SUPPLY

Canada is the world's fifth largest producer of natural gas, with an estimated 1,225 trillion cubic feet (tcf) of remaining natural gas resources.<sup>2</sup>

Over the past decade, technology advances such as horizontal drilling and multi-stage fracturing have unlocked Canada's shale and tight gas resources. In 2007, production from conventional, non-tight resources made up just over 60% of total Canadian natural gas volumes. Production of gas from tight and shale deposits has grown from 30% of total volumes in 2007 to almost two-thirds in recent years.<sup>3</sup> By

2040, conventional production is expected to fall to 4% of total output.

In the National Energy Board's most recent energy market assessment<sup>4</sup>, the country's natural gas production in the Reference Case declines early in the projection period to a low of 15.9 bcf/d in 2021 before increasing to 20.9 bcf/d in 2040. [Note: the NEB's Reference Case is based on a current economic outlook, a moderate view of energy prices and technological improvements, and climate and energy policies announced at the time of analysis.]



(Source: Canada's Energy Future 2018, NEB)

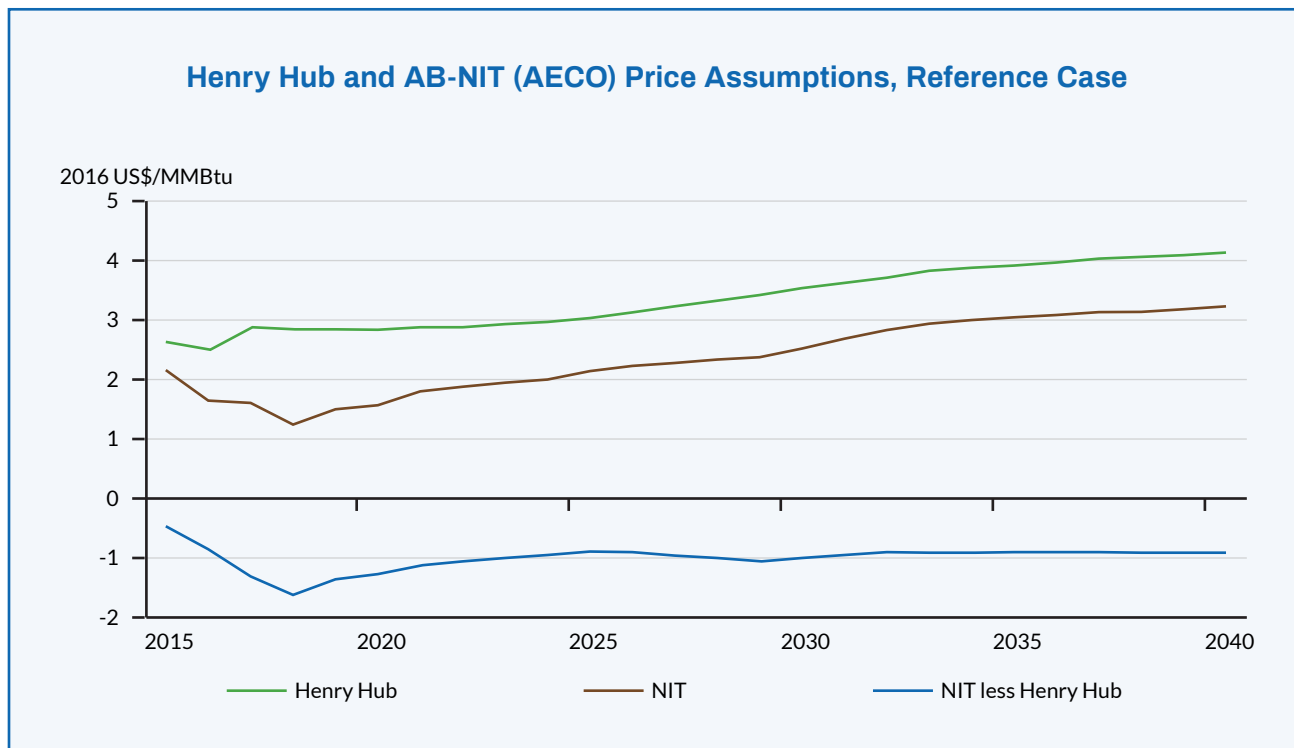
<sup>2</sup> National Energy Board (NEB), 2017

<sup>3</sup> International Energy Agency (IEA), Gas 2019: Analysis and Forecast to 2024

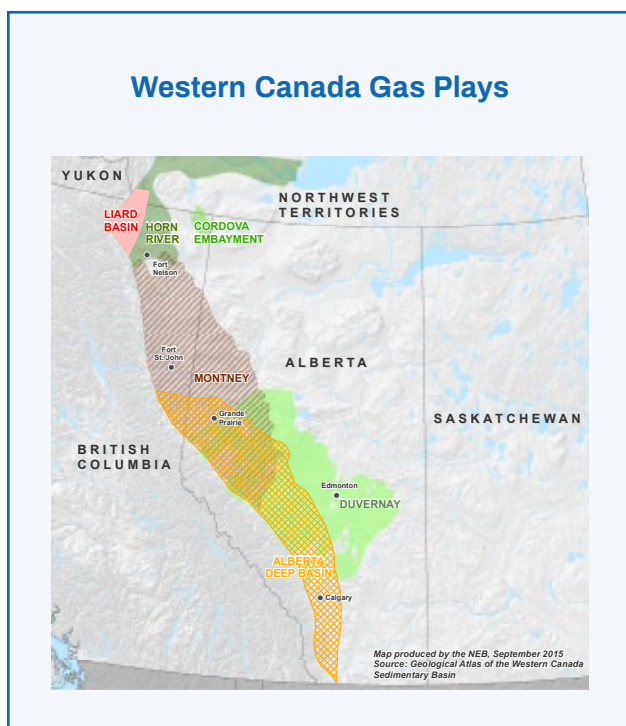
<sup>4</sup> NEB, Canada's Energy Future 2018: Energy Supply and Demand Projections to 2040

Production begins to increase after 2021 as gradually higher prices (see below for AB-NIT price assumptions) encourage enough drilling to offset production declines from older wells, and

development associated with assumed LNG exports support increased capital spending. This leads to more natural gas wells and production in Western Canada.



(Source: Canada's Energy Future 2018, NEB)



(Source: Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040)

The majority of production growth over the NEB's projection period comes from the Montney formation, with tight gas output reaching 12.1 bcf/d in 2040, a 131% increase from 5.3 bcf/d in 2017. Production of tight gas from the Montney play — a large resource that stretches from northeast B.C. into northwest Alberta — has grown significantly over the past five years. In 2017, production of Montney tight gas comprised almost 35% of total natural gas production (5.3 bcf/d), up from zero production prior to 2006. In the Alberta Deep Basin — a tight gas play that runs along the Alberta foothills — production grows modestly as natural gas and NGL prices increase, rising to four bcf/d by 2040 from 3.4 bcf/d in the Reference Case.

The Duvernay and Horn River shale gas plays currently produce small amounts of natural gas, and production from both grows modestly over the projection period with combined production from the two plays increasing to 900 mmcf/d in 2040 from 500 mmcf/d in 2017 for the Reference Case.

## THE GLOBAL SUPPLY PICTURE

Global natural gas production is forecast to rise from 3.94 trillion cubic metres (tcm) in 2018 to 4.33 tcm by 2024, an average annual increase of 1.6%, the International Energy Agency (IEA) says in a recent report.<sup>5</sup>

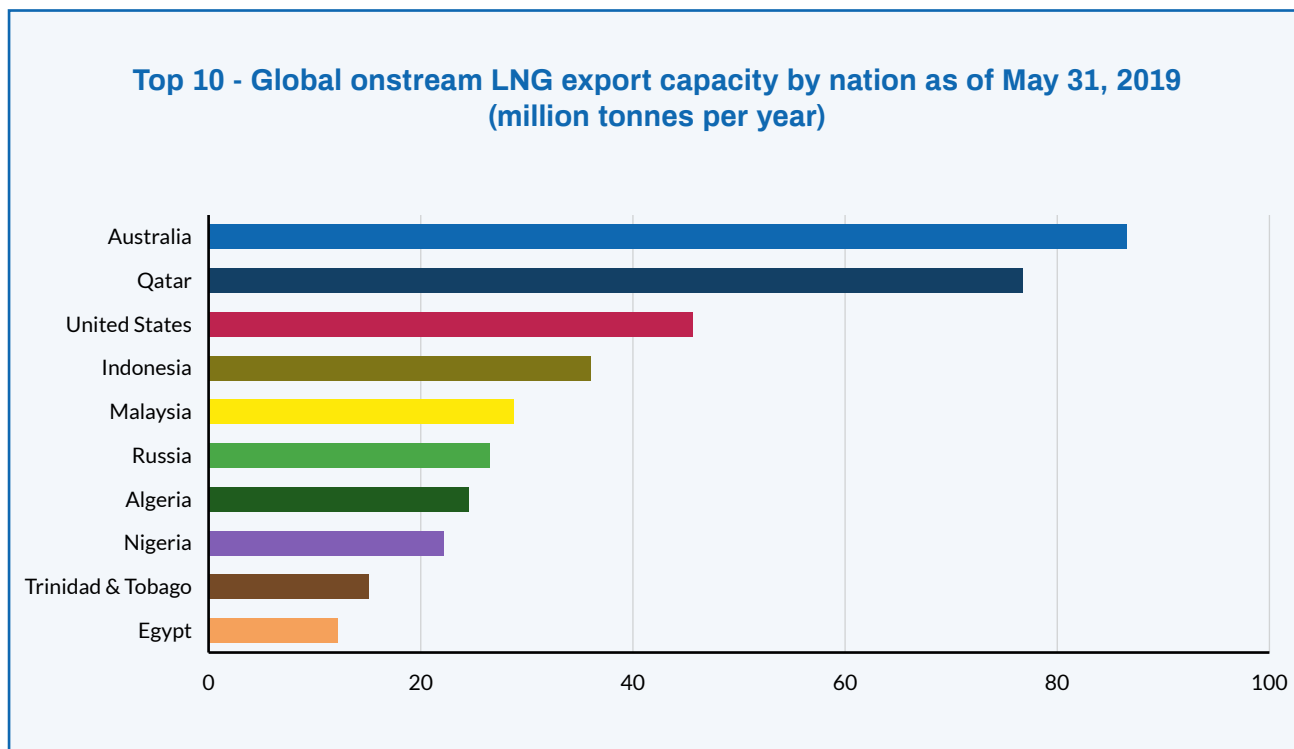
The U.S. provides the largest individual contribution to this increase due to its ample shale gas resources. China and Australia drive production growth in the Asia Pacific region, while production growth in other Asian economies remains limited due to the depletion of historical resources and the lead time of exploration and production investment.

Gas production in the Middle East keeps on growing at a stable rate, but is mainly driven by domestic needs in Iran and Saudi Arabia. While prospects for production development in Qatar remain uncertain, especially surrounding the timing of LNG export capacity expansion, the IEA forecast assumes a stable level of production to 2024 in the absence of a final investment decision (FID) on LNG expansion at the time of writing.

BP's most recent projection<sup>6</sup> says global gas development is expected to grow strongly to 2040, supported by broad-based demand, plentiful low-cost supplies, and the increasing availability of gas globally, aided by the growing supplies of LNG.

In its Evolving Transition (ET) scenario, natural gas grows at an average rate of 1.7% per annum — increasing nearly 50% by 2040 — the only source of energy, along with renewables, whose share in primary energy increases over the outlook period. [Note, BP's Evolving Transition scenario assumes that government policies, technology and social preferences continue to evolve in a manner and speed seen over the recent past.]

Natural gas output is led by the U.S. and Middle East (Qatar and Iran) — who together account for almost 50% of the growth in gas production to 2040 — supported by strong increases in output in China and Russia, BP says.



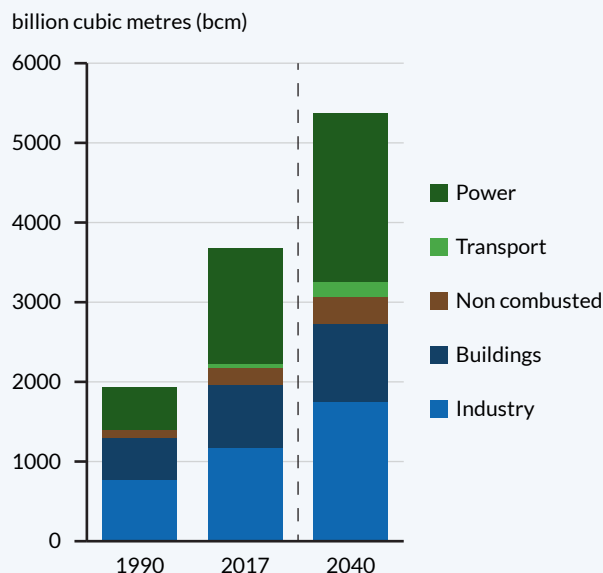
Source: Evaluate Energy

<sup>5</sup> IEA, *Gas 2019: Analysis and Forecast to 2024*

<sup>6</sup> BP *Energy Outlook 2019*

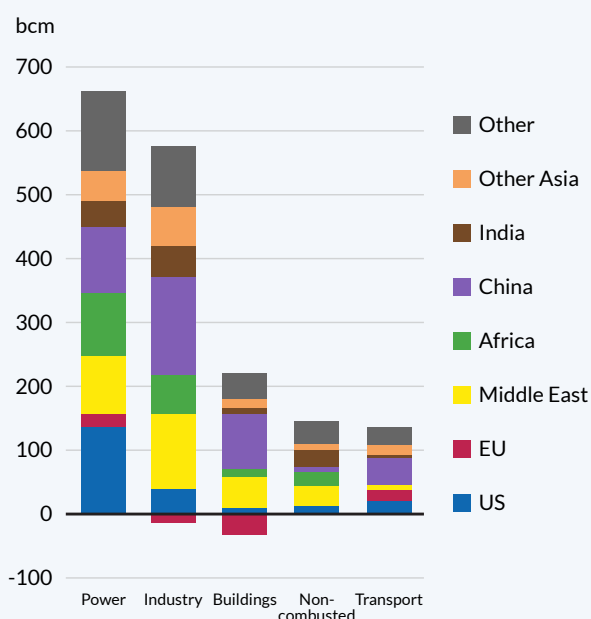
# NATURAL GAS DEMAND

## Gas Consumption by Sector



Source: BP Energy Outlook, 2019

## Gas Consumption: Growth by Sector and Region, 2017 – 2040



Source: BP Energy Outlook, 2019

Global demand for natural gas grew 4.6% in 2018, its fastest annual pace since 2010.<sup>7</sup> Chinese natural gas consumption grew by an astounding 18% last year.

Industrial use of natural gas, both as a fuel and a feedstock, is set to expand at an average annual rate of 3% and account for almost half of the rise in global consumption to 2024, according to the IEA's latest annual market report. Power generation remains the largest consumer of natural gas, in spite of slower growth due to strong competition from renewables and coal.

BP also projects that natural gas demand is led by industry and the power sector.<sup>8</sup> In its ET scenario, the use of gas in industry accelerates over the outlook period to 2040, while the growth of gas in the power sector slows. The increased industrial demand for gas over the outlook is largely driven by developing economies as they continue to industrialize, especially in regions with large gas resources (Middle East, Africa). Coal-to-gas switching, especially in China, also supports gas demand in industry.

The additional gas absorbed by the power sector is driven by the overall growth of power demand, with the share of natural gas in the global power sector remaining relatively stable at around 20%.

Although the use of gas within the transport sector grows rapidly, it remains small relative to industry and power. The use of gas for heating buildings also expands during the period, although slower than other sectors.

<sup>7</sup> IEA, Gas 2019: Analysis and Forecast to 2024

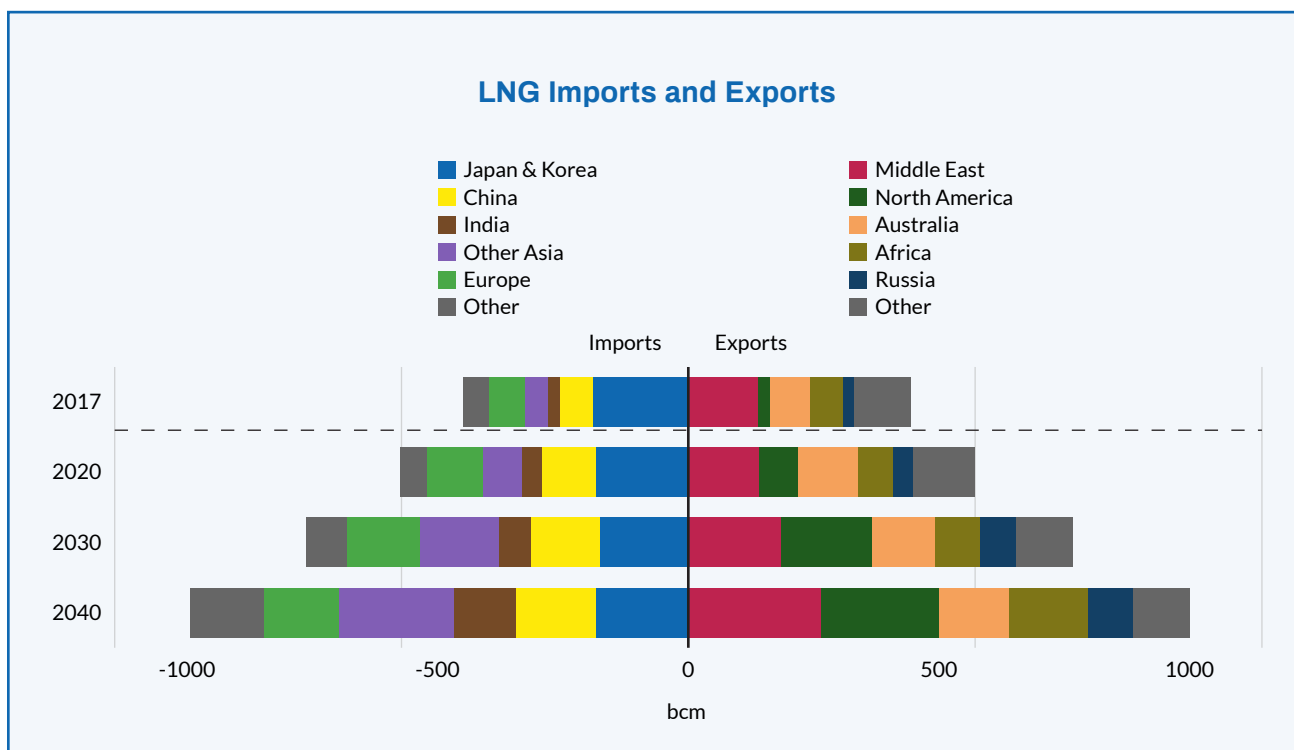
<sup>8</sup> BP Energy Outlook 2019



## LNG CONTINUES TO EXPAND ITS REACH

Global LNG volumes are set to expand substantially. In BP's Evolving Transition (ET) scenario, LNG trade more than doubles, reaching almost 900 billion cubic metres (bcm) in 2040, up from around 400 bcm in 2017.<sup>9</sup>

The increase in LNG exports is led by North America, followed by the Middle East, Africa and Russia. As the LNG market matures, the U.S. and Qatar emerge as the main centres of LNG exports, accounting for around 40 per cent of all LNG exports by 2040.



Source: BP Energy Outlook, 2019

According to the BP outlook, Asia remains the dominant market for LNG imports, although the pattern of imports within Asia shifts, with China, India and Other Asia overtaking the more established markets of Japan and Korea, and accounting for around half of all LNG imports by 2040.

Europe remains a key market, both as a “balancing market” for LNG supplies and a key hub of gas-on-gas competition between LNG and pipeline gas. The European market is growing because countries like Germany don’t want to be over-reliant on Russia for their gas supplies.

Overall, LNG is becoming a much larger part of the global energy system with over 40 countries now importing LNG compared to fewer than 10 in 2000.<sup>10</sup>

<sup>9</sup> BP Energy Outlook 2019

<sup>10</sup> International Energy Agency (IEA)

## CHINESE DEMAND FOR GAS AND LNG 'ALMOST INFINITE'

In China, imported LNG can be a key driver in the country's efforts to tackle poor air quality. Over the last few years, natural gas has been used mainly to replace coal-fired boilers in residential buildings or in smaller industrial facilities on the outskirts of towns that are the source of many of the particulate emissions related to health impacts in China and elsewhere.

Yao Li, CEO of Chinese energy consulting firm SIA Energy, says that China's demand for LNG is "almost infinite." The country's shift from coal to natural gas to provide power will require a substantial increase in LNG imports, Li says, since only about 57% of its natural gas needs are supplied domestically. China will not be able to repeat the American shale gas revolution, she adds, so it will need a lot of imports of LNG.

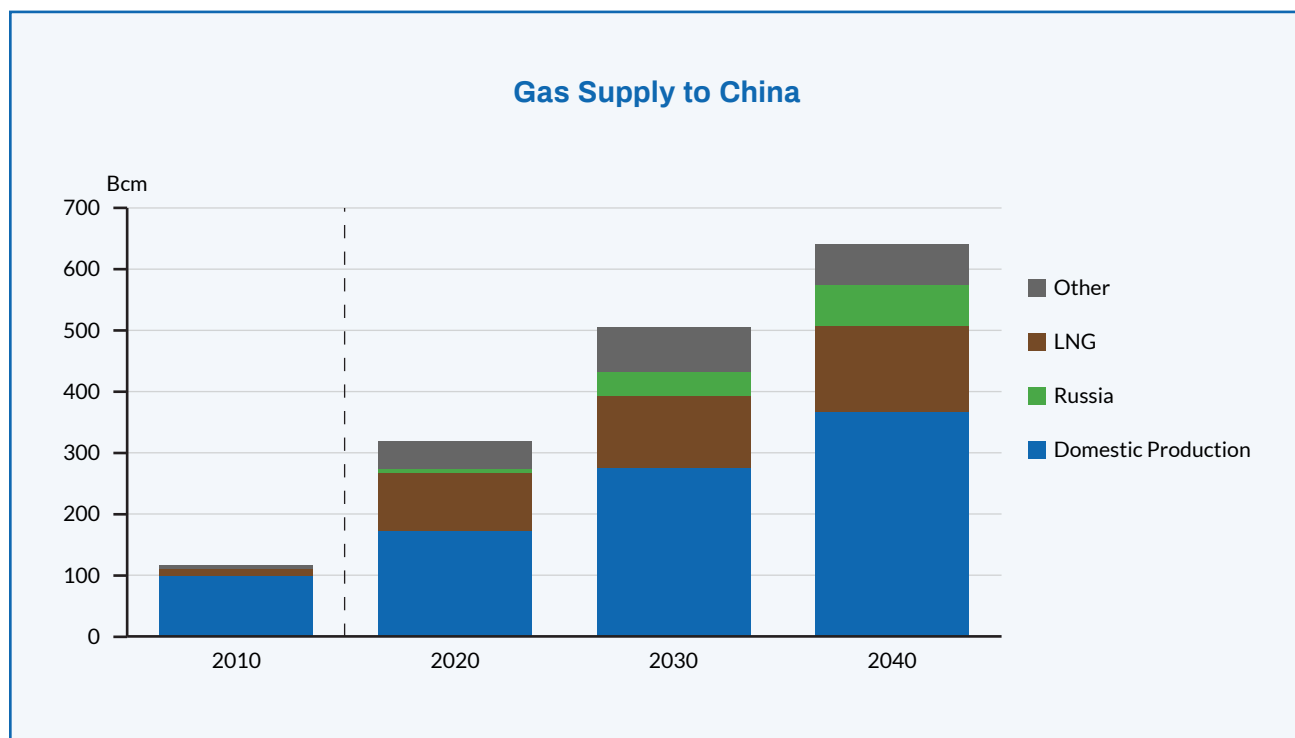
While LNG suppliers can expect other Asian countries, such as India, to also increase their imports of LNG, it is China that represents the biggest market.

China is on target to be the largest LNG importer by 2025.

Two years ago, 60% of China's primary energy came from coal. It fell to 56% in the first quarter of 2019. Natural gas consumption rose from 6.5% of total energy consumption to 8.3% over that period. Li estimates China's demand for LNG imports will rise from less than 40 million tonnes per annum (mtpa) to 90 mtpa by 2030.

**The country's shift from coal to natural gas to provide power will require a substantial increase in LNG imports.**

**— Yao Li, SIA Energy**



Source: BP Energy Outlook, 2019

# LNG: CANADA'S GLOBAL MARKET OPPORTUNITY

Canada's natural gas producers, LNG developers, as well as industry associations and LNG industry groups all speak optimistically about the future of LNG development, given the demand outlook.

To realize how important a new industry such as LNG is to Canada, you need look no further than the newly formed LNG Narrative Group. This organization was formed by the Canadian Society for Unconventional Resources (CSUR), Resource Works, the Canadian Global Affairs Institute (CGAI) and JWN Energy (publisher of the Daily Oil Bulletin). The purpose of

this coalition is to prepare a compelling narrative to all Canadians on the importance of this transformative industry on behalf of all stakeholders — business, First Nations and government.

Dan Allan, president of CSUR, says LNG represents a key opportunity to kick the country's natural gas sector back into high gear over the long-term. "A large majority of our members are gas producers and they urgently require a robust LNG industry to allow for market diversification," he says.

## EXPANDING MARKETS ARE CRUCIAL FOR CANADIAN PRODUCERS

Darren Gee, president and CEO of Peyto Exploration & Development Corp., says it's crucial for producers to have access to markets outside North America. He also believes Canada has a moral obligation to provide the rest of the world with the country's clean, responsibly-developed energy to improve lives and preserve the environment. Natural gas is the fuel for the future, Gee says.

With the shale gas revolution in the U.S., however, production in Western Canada has declined over the past decade to about 16 bcf/d from 18 bcf/d.

Prices have also collapsed. "The price doesn't need to be \$10 ... but now it's selling for 65 cents," Gee said recently, adding that it's virtually impossible for gas production to be profitable at those prices.

Peyto is one of the producers in a 10-member

consortium of mainly Montney operators that is in negotiations with a number of partners on a way to export their natural gas as LNG.

"This is what Alberta needs," says Jeff Tonken, president and CEO of Birchcliff Energy Ltd., another consortium member. "We need to sell our Alberta gas internationally."

The producer group, which also includes Seven Generations Energy Ltd. and Advantage Oil & Gas Ltd., announced its formation in February 2019 to explore various opportunities for supplying LNG projects. "What the consortium has is a significant amount of gas as a group which then gives us the credibility to be able to [negotiate a deal]," Tonken says, without speculating on how long that might take and noting that there are still "tons" of moving parts.

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**"A large majority of our members are gas producers and they urgently require a robust LNG industry to allow for market diversification."**

**— Dan Allan, CSUR**

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## SLOW GROWTH IN CANADA

A decade ago there were more than 20 LNG export projects proposed for Canada's West Coast, but developers have dropped plans for most of those, with the exception of the Shell-led LNG Canada project and the smaller Woodfibre LNG project, planned for the Squamish area of B.C. It would be about one-

quarter of the size of LNG Canada. Chevron Canada Limited earlier this year applied to the National Energy Board (NEB) for a licence to export LNG from Canada for a term of 40 years. And on the East Coast, Pieridae Energy Limited is planning to develop an LNG project near Goldboro, N.S.

### Selected Key LNG Projects in Western Canada

Project	Owner(s)	Capacity	Capital Cost (billions)	Status
LNG Canada	Shell, PETRONAS, PetroChina, Mitsubishi Corporation, KOGAS	13-26 mtpa 1.7-3.4 bcf/d	\$40	Under construction; completion expected by 2025
Kitimat LNG	Chevron, Woodside Energy	10 mtpa 1.3 bcf/d	N/A	Chevron has applied to nearly double project capacity; completion expected by 2029
Woodfibre LNG	Pacific Oil & Gas	2.1 mtpa 0.3 bcf/d	\$1.8	Final investment decision expected in mid-2019; completion in 2023

\* Only projects with export licenses and regulatory approvals in place are included. Source: Canadian Energy Research Institute, company announcements

### Selected Key LNG Projects in Eastern Canada

Project	Owner(s)	Capacity	Capital Cost (billions)	Status
Goldboro LNG (Nova Scotia)	Pieridae Energy	5-10 mtpa 0.7-1.3 bcf/d	\$10	Final investment decision expected in 2020; completion in 2024-2025
Bear Head LNG (Nova Scotia)	LNG Limited	8-12 mtpa 1.1-1.6 bcf/d	\$6	
Énergie Saguenay (Quebec)	GNL Quebec	11 mtpa 1.5 bcf/d	\$9	Final investment decision expected in 2020; completion in 2025

\* Only projects with export licences and regulatory approvals in place are included. Source: Canadian Energy Research Institute, company announcements

The NEB's most recent energy market report<sup>11</sup> assumes LNG exports from B.C.'s coast begin in 2025 at 750 mmcf/d and double by 2026 to reach 1.5 bcf/d.

A second phase assumed to come online in 2030 would increase total LNG exports to 2.25 bcf/d in 2030 and 3.0 bcf/d in 2031.

However, LNG veteran Alfred Sorenson, president of Pieridae, points out that Cheniere Energy Inc., a first-mover in LNG development on the U.S. Gulf Coast, is about to develop its sixth train of LNG exports, which will lead to exports of about six bcf/d overall.

Pieridae's plant, unlike those on Canada's West Coast, which are aimed at exports to Asia, is being designed to transport LNG to Europe and possibly India and elsewhere. In 2013, the company finalized a 20-year agreement to sell five million tonnes per year of LNG to German-based utility and energy company Uniper Global Commodities SE.

He says governments and Canadians need to support LNG development. Moreover, the departure of U.S.-based majors and international companies like Shell

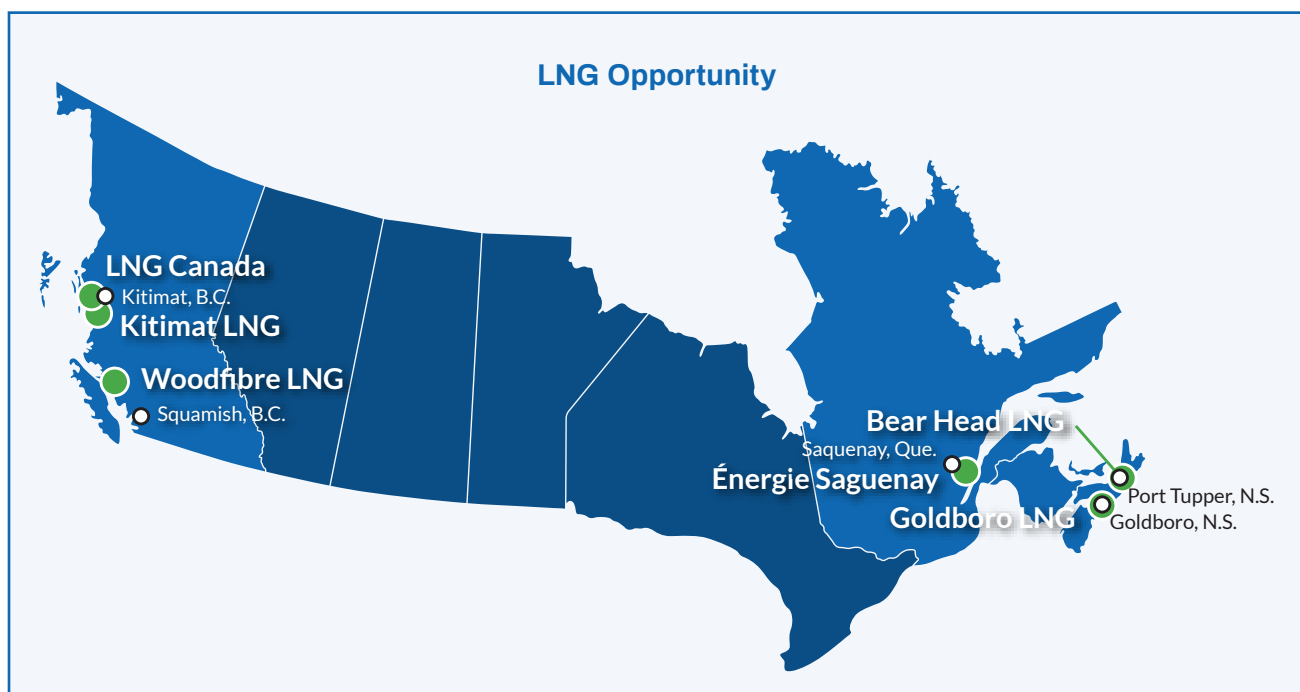
from being heavily invested in the oilsands sector should be a lesson for Canada as the LNG sector needs to attract domestic and foreign investment.

While some analysts suggest there is a narrow window of opportunity within which future LNG projects will need to fit, Birchcliff's Tonken doesn't buy that. "I believe that when you watch the large international players, or look at their presentations, the world is going to LNG so that window is a huge window."

However, "what we are missing is the fact that all the investors have left the industry so if we don't get them back to support what we want to do, then we've got a problem," he says.

**"The departure of U.S.-based majors and international companies like Shell from being heavily invested in the oilsands sector should be a lesson for Canada as the LNG sector needs to attract domestic and foreign investment."**

**— Alfred Sorenson, Pieridae**



<sup>11</sup> NEB, *Canada's Energy Future 2018: Energy Supply and Demand Projections to 2040*

# ANALYSIS: CANADA ENTERING COMPETITIVE LNG MARKETPLACE

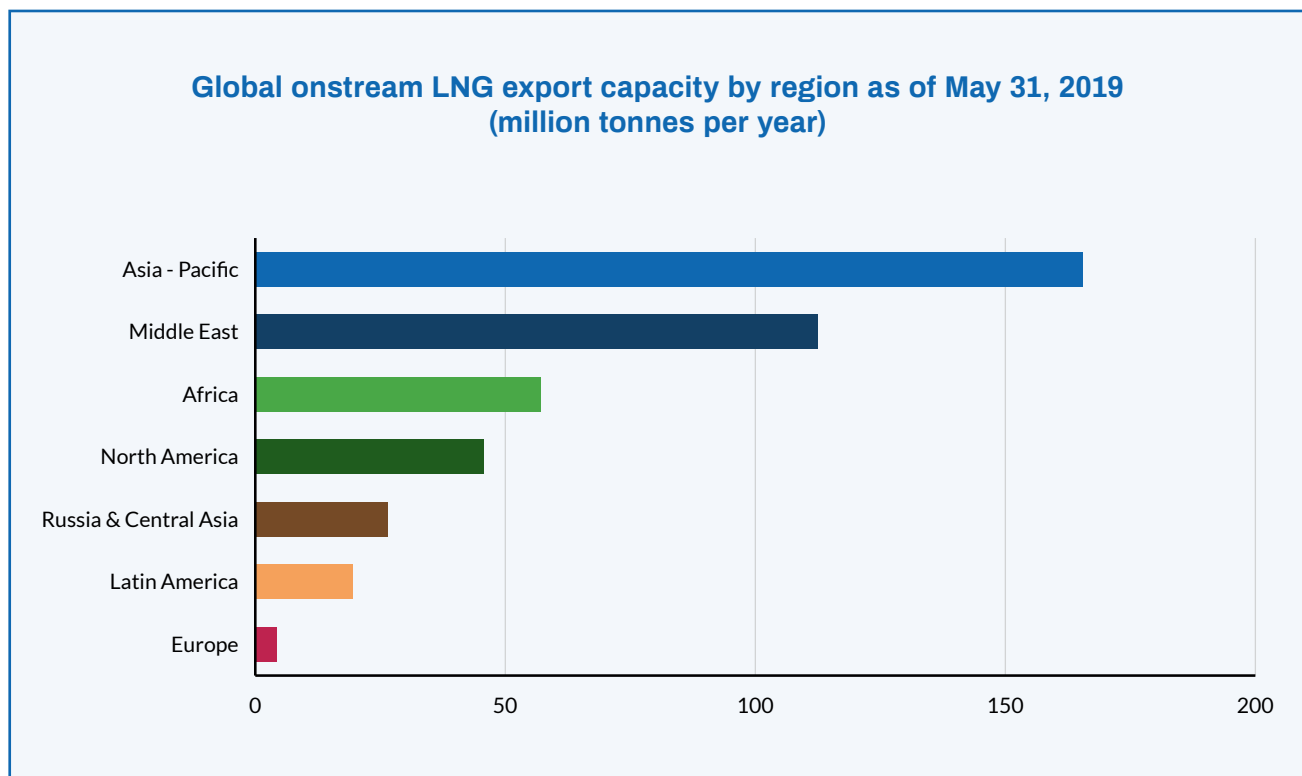
Finding buyers for LNG in an increasingly competitive market is a key obstacle to overcome for any of Canada's many LNG export projects heading into the 2020s.

Even after all approvals and licences have been awarded and any required funding has been secured, if a project cannot find a buyer, it cannot succeed.

LNG Canada and Woodfibre LNG on the West Coast and Pieridae's Goldboro project on the East Coast are the only Canadian projects that have secured long-term buyers so far and competition is growing fast in ideal markets.

"For Canada's West Coast projects, all eyes are on the Asia Pacific region. It is home to the world's three largest LNG consumers in China, Japan and South Korea. Canada, due to proximity, is potentially a key exporter for these nations thanks to low transportation costs compared to competing regions from further afield," says Mark Young, a senior oil and gas analyst with Evaluate Energy.

"But this cost advantage will not be enjoyed — at least not to so great an extent — over major LNG producing nations in the Asia Pacific region itself. This is the largest LNG producing area in the world thanks to volumes from Malaysia, Indonesia and Australia."



Source: Evaluate Energy



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**“LNG Canada appears to be Canada’s best chance to enter the LNG export market in the near future and Pieridae is undoubtedly taking its own encouraging steps to export from the East Coast.”**

**— Mark Young, Evaluate Energy**

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Within the next year, Australia is set to briefly overtake Qatar as the world’s largest exporting nation until a major expansion in Qatar completes in 2024. Other Asia Pacific expansions are also set to be completed before a single Canadian LNG cargo leaves the West Coast.

To add to this competition, major importing companies from China, Japan and South Korea can be seen securing supply and effectively cutting their overall import costs by taking minor stakes in export projects all over the world.

Despite all of this, LNG Canada stands out as highly promising among Canadian West Coast projects with regards to entering this target market.

- Its owners are all heavily involved in Asia Pacific LNG trading, taking LNG from projects they own into their “global portfolio” that is used to sign supply deals all over the world. Shell and partner Petronas are both among the world’s very largest companies.
- Its owners also include Japan-headquartered Mitsubishi Corp., which has been very quick to sign up fellow Japanese companies as future buyers on long-term contracts for LNG Canada’s gas since the FID was announced last year.
- China, through PetroChina, and South Korea, through Korea Gas, are also represented in LNG

Canada’s ownership. There are only a handful of projects worldwide with this elite roster of backers.

Other projects on the West Coast do not tend to have such powerful backing, have not reached FID and, with the exception of Pacific Oil & Gas’ smaller Woodfibre LNG project, do not have buyers in place. (In June 2019, Woodfibre announced it has signed a unit of BP Plc as its first customer.)

“It remains to be seen how much of a Far Eastern market will be left if, and when, these other projects finally enter the market, but it is certain that the market will be far more crowded with suppliers when they do,” says Young.

It is a similar story on the East Coast. For projects here, the ideal market due to proximity would be Europe. Europe’s coastline is peppered with LNG import facilities and the region has been importing LNG for decades, but expansion plans are relatively scarce. Canada’s East Coast exporters will be attempting to enter a market late in the day.

“Pieridae Energy stands out as it has managed to do this by signing one of the world’s single largest supply deals over the past few years with Germany’s Uniper, a 20-year deal to provide Uniper with five million tonnes a year from 2023 from its Goldboro project in Nova Scotia,” says Young.

Other planned projects on the East Coast, where buyers are not yet secured, will have to contend with expanding competition from Qatar, new projects that are springing up in the U.S. and the vast supply of Russian pipeline gas, among others. An added issue is that no East Coast export project has any major LNG trader or potential customer in an ownership position, like LNG Canada, to secure a portion of the market that way.

“LNG Canada appears to be Canada’s best chance to enter the LNG export market in the near future and Pieridae is undoubtedly taking its own encouraging steps to export from the East Coast,” says Young.

## NEXT “WAVE” ESSENTIALS

Canada has many of the elements that position it to become a major LNG supplier in the future. Reserves are plentiful. The technology that is used to drill for and produce gas in an efficient and environmentally friendly manner is second-to-none. There is a sophisticated midstream and pipeline sector to deliver that gas to market. Export points on both the West Coast and the East Coast provide market benefits vis-à-vis other global LNG suppliers.

A national strategy to kick-start additional Canadian LNG development would help: In order to compete with other LNG export projects in the U.S. Gulf Coast, in Asia, or Australia, it is essential that all levels of Canadian government support LNG exports with policies that make domestic projects more globally competitive. If it doesn't, the country may miss the next global demand wave.

# REFERENCE MATERIAL – KEY CANADIAN LNG PROJECTS<sup>11</sup>

## 1. LNG Canada

- Location: Kitimat, B.C.
- Proponents: A joint venture comprised of Royal Dutch Shell plc, through its affiliate Shell Canada Energy (40%); PETRONAS, through its wholly-owned entity, North Montney LNG Limited Partnership (25%); PetroChina Company Limited, through its subsidiary PetroChina Canada Ltd. (15%); Mitsubishi Corporation, through its subsidiary Diamond LNG Canada Partnership (15%); and Korea Gas Corporation, through its wholly-owned subsidiary Kogas Canada LNG Ltd (5%).
- Capacity: The project will initially export 14 mtpa, the equivalent of about 1.8 bcf/d, from two processing units. At full build out, LNG Canada will have four trains or processing units, each with the capacity to process approximately 7 mtpa of LNG for export to countries in Asia and elsewhere.
- FID: A final investment decision was made for the first two trains on Oct. 1, 2018.
- Anticipated onstream date: 2025.
- Associated infrastructure: TC Energy will build, own and operate the 670-kilometre Coastal GasLink (CGL) pipeline that will connect natural gas from northeast B.C. to the export plant.
- Regional economic benefits: 4,500 people employed at peak construction on the Kitimat site.
- Recent announcements:
  - In June 2019, the federal government said it will spend \$220 million to help fund energy-efficient gas turbines and another \$55 million to replace a bridge for the project.
  - In April 2019, the LNG Canada project owners officially handed over construction management to their prime contractor, JGC Fluor.
  - In January 2019, LNG Canada approved \$937 million in contracts and subcontracts to First Nations and Canadian businesses.
- More details: <https://www.lngcanada.ca/>

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<sup>12</sup> Updated as of July 15, 2019



## 2. Kitimat LNG

- Location: Bish Cove, near Kitimat, B.C.
- Proponents: The proposed project is a 50/50 joint venture between Chevron Canada Limited and Woodside Energy International (Canada) Limited.
- Capacity: The Kitimat LNG plant includes up to three LNG trains totalling 18 mtpa (6.0 mtpa/train). The initial foundation project consists of two trains (12 mtpa).
- Anticipated FID: 2022 to 2023.
- Construction of Phase 1: 2022/23 to 2028/29; commissioning of first LNG train begins after construction is complete; commissioning of second LNG train begins three weeks after the commissioning of the first train; construction and commissioning of the third LNG train as market conditions allow.
- Associated infrastructure: The 471-kilometre Pacific Trail Pipeline (PTP).
- Regional economic benefits: At peak construction of the LNG facility, it is estimated that more than 3,000 people would be working on the Kitimat

LNG plant site with another 1,500 workers building PTP. In addition, Kitimat LNG has a benefits agreement with the Haisla Nation for the plant, which is located on Haisla Nation Reserve land, and an agreement with all 16 First Nations along the proposed PTP route through the First Nations Limited Partnership (FNLP).

- Recent announcements:
  - In July 2019, in an NEB filing, the proponents said supply will come from the equity gas resources of Chevron and Woodside held together in the Liard Basin, Chevron's equity gas resource in the Kaybob Duvernay resource and, if needed, from other contingent and prospective resources, and open market purchase or swaps made in WCSB market hubs.
  - In July 2019, the project proposed to become an all-electric plant that will be powered by hydroelectricity from BC Hydro. In July, the proponents also proposed a third train for the project.
- More details: <https://canada.chevron.com/our-businesses/kitimat-lng-project>

## 3. Woodfibre LNG

- Location: Squamish, B.C.
- Proponents: Woodfibre LNG Limited is a subsidiary of Pacific Oil & Gas Limited (PO&G), part of the Singaporean conglomerate RGE.
- Capacity: The project is licensed to export about 2.1 mtpa for 40 years.
- Anticipated FIB: Summer 2019.
- Anticipated onstream date: 2023.
- Associated infrastructure: The project will receive natural gas from the Eagle Mountain – Woodfibre Gas Pipeline (EGP) Project.
- Regional economic benefits: 650+ jobs at peak construction; 100+ jobs at Woodfibre site;

1,410+ additional indirect or induced jobs during construction or at the site thereafter.

- Recent announcements:
  - In July 2019, the BC Oil and Gas Commission (OGC) approved Woodfibre LNG's permit for its export facility.
  - In June 2019, Woodfibre said that BP Gas Marketing Limited had agreed to buy 0.75 mtpa of LNG for 15 years starting in 2023.
  - In May 2019, PO&G said it is acquiring all of the issued and outstanding shares of privately-held Canbriam Energy Inc. and its Montney assets.
- More details: <https://www.woodfibrelng.ca/>

## 4. Goldboro LNG

- Location: Goldboro, N.S.
  - Proponents: Pieridae Energy (Canada) Ltd.
  - Capacity: up to 10 mtpa.
  - Anticipated FID: 2020.
  - Anticipated onstream date: Commercial deliveries of gas to Uniper are expected to start between Nov. 30, 2024, and May 31, 2025.
  - Associated infrastructure: The facility is located adjacent to the Maritimes & Northeast Pipeline, a 1,400-kilometre transmission pipeline system built to transport natural gas between developments in Nova Scotia, Atlantic Canada and the northeastern United States.
  - Regional economic benefits: Construction phase – up to 3,500 jobs at the Goldboro site; ongoing operation and maintenance – up to 200 positions.
  - Recent announcements:
    - In July 2019, Pieridae said it has negotiated extensions of the key deadlines under its 20-year agreement with German utility Uniper.
    - In June 2019, Pieridae signed a purchase and sale agreement with Shell Canada Energy to acquire all of Shell's midstream and upstream assets in the southern Alberta Foothills for C\$190 million. Shell Canada will take an equity stake in Pieridae.
  - More details: <https://pieridaeenergy.com>
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## GLOSSARY & CONVERSIONS

**mmcf/d** = million cubic feet per day

**bcf/d** = billion cubic feet per day

**tcf** = trillion cubic feet

**bcm** = billion cubic metres

**mtpa** = million tonnes per annum

**1 bcf/d** = 7.55 mtpa

**1 mmcf/d** = 0.267 mtpa

**1 cubic metre** = 0.0007 tonnes

## WEB RESOURCES

[Canadian Society for Unconventional Resources](#)

[JWN Energy](#)

[Daily Oil Bulletin](#)

[Evaluate Energy](#)

[Alberta government - Natural Gas](#)

[B.C. government - Natural Gas & Oil](#)

