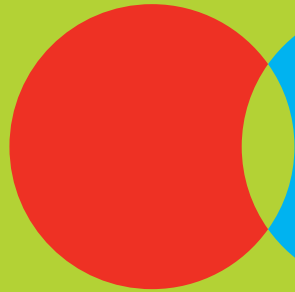


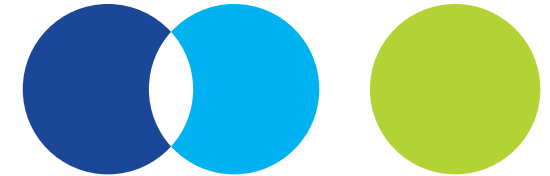
**The Conference
Board of Canada**



A Rising Tide

The Economic Impact of B.C.'s Liquefied Natural Gas Industry

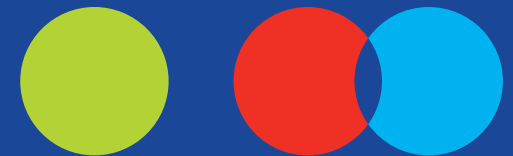
Contents



- 3 Key findings**
- 4 A rising tide**
- 5 Asian markets present a demand opportunity**
- 6 The investment wave**
- 9 The employment wave**
- 10 The government revenue wave**
- 12 Appendix A**
Methodology
- 13 Appendix B**
Annual GDP impacts by province and sector
- 14 Appendix C**
Average annual labour impacts by province and sector
- 15 Appendix D**
Bibliography

Key findings

- This briefing examines the economic impacts of an investment scenario that creates Canadian LNG industrial capacity of 56 million tonnes per annum in British Columbia.
- Between 2020 and 2064, total annual investments under this scenario would average over \$11 billion, or more than \$500 billion over the period.
- Canada's GDP would increase, on average, by more than \$11 billion per year over the term of the scenario. B.C.'s portion would exceed \$8 billion annually, an increase in the province's GDP of over 3 per cent. Alberta's GDP would see an annual increase of \$1.6 billion, or just over 0.5 per cent. For Ontario, the figure would be \$1 billion, or just over 0.1 per cent of annual GDP.
- National employment would increase by 96,550 jobs annually over the life of the project. The gain of 71,000 jobs annually in British Columbia alone would represent a 3 per cent increase in total provincial employment as of May 2020.
- Ontario, Alberta, and Quebec would all see permanent job increases.
- The industry would boost total wages in Canada by over \$6 billion a year, with B.C. realizing \$4.6 billion of that increase.
- Over the 2020–64 period, more than \$90 billion in revenue could be generated for provinces and territories in Canada. Of this total, over \$78 billion would accrue to British Columbia. Over \$64 billion would be generated for the federal government.
- With nearly \$2 billion in annual tax and royalty payments, the LNG sector would become one of the largest revenue generators in B.C.



A rising tide

B.C. is becoming the focal point for a new Canadian industry—liquefied natural gas (LNG). Canada produces almost twice as much natural gas as it uses.

Liquefying and exporting natural gas offers an important diversification opportunity, especially when our traditional export market—the United States—is becoming increasingly self-sufficient. LNG-based natural gas prices in Asia-Pacific markets have been higher than North American prices for over a decade. Moving Canadian natural gas into those markets could provide Canadian natural gas producers and LNG investors with higher returns. Natural gas as a marine fuel also represents an opportunity for Canadian ports and ship builders. Domestically, LNG could offset diesel and heavy oil bunker fuel and contribute to GHG emissions reductions domestically and globally. Canadian governments would also benefit from an LNG industry through new royalty and tax revenues.

Post-pandemic, the Canadian economy will need stimulus. An LNG industry brings long-term investment and production that can contribute to the country's economic recovery.

Globally, the LNG industry is highly competitive. Investors look for jurisdictions with the right mix of policies, location, natural gas supply, supporting infrastructure, regulatory processes, and

availability of skilled labour. British Columbia meets many of these needs. It offers abundant resources and clean electricity, and is close to export markets.

The tax and fiscal environment, regulatory approval timelines, and policy support can all be improved. When comparing the LNG investment landscape in B.C. to that of key competing regions (for example, the U.S. Gulf of Mexico states), some of these challenges become highlighted. Accelerated regulatory approvals, municipal property tax breaks, enhanced capital cost allowances, existing pipeline supply infrastructure, and existing LNG facilities with trained workforces elsewhere make attracting LNG investment to a fledgling B.C. industry challenging. Despite these challenges, there's a rising tide of interest in growing an LNG industry in British Columbia.

This report is based on a scenario that creates a 56-million-tonne per annum (mtpa) LNG industrial footprint in British Columbia which includes commitments already made by LNG Canada (see Appendix A). But before it can produce that first tonne of LNG, the industry needs investment in the facilities, businesses, and skills required to find, process, and take the product to market. Using the assumptions in our methodology section (see Appendix A), this briefing examines the economic impact this scale of investment would likely have on British Columbia and Canada. It will take four to five years to build each facility included in this scenario.

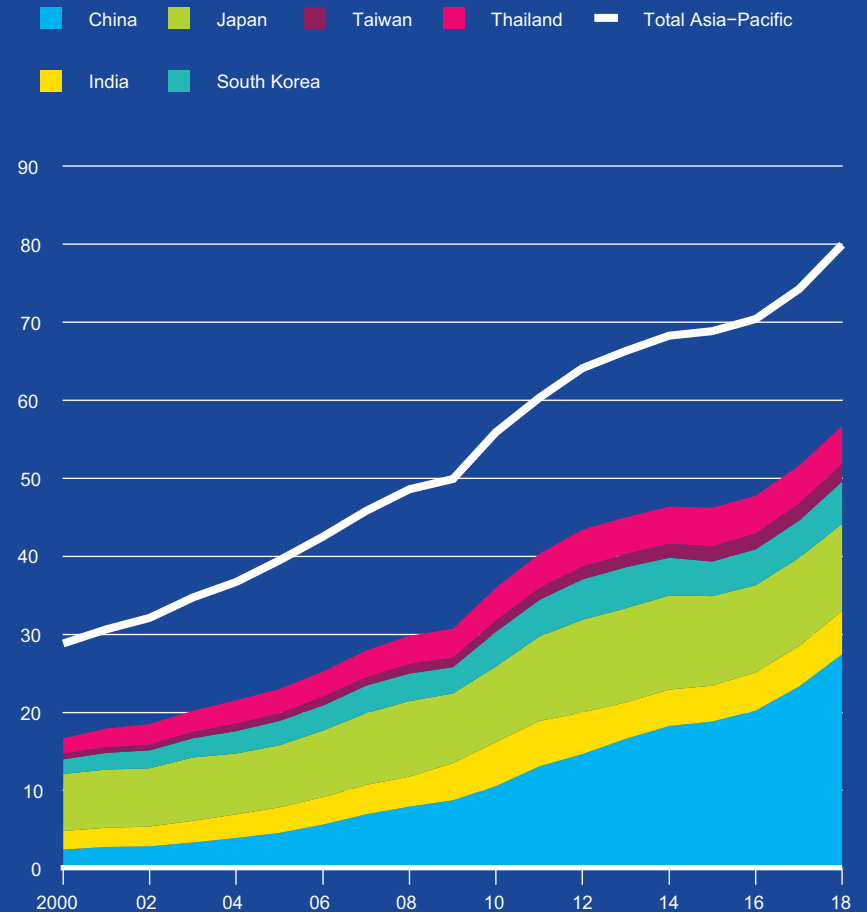
But LNG facilities are long-lived assets—they would operate over an expected 40-year lifespan. The projected impact shows an LNG industry providing economic growth, employment, taxes, and royalty revenues to B.C., other Western provinces, Ontario, Quebec, and the federal government for decades to come.

Asian markets present a demand opportunity

The B.C. LNG industry has a competitive advantage—it is close to many Asia-Pacific markets. This proximity provides access to the growing demand from residential and commercial heating, industrial process heat and energy, and power generation throughout that region. LNG is already an important fuel for the region. In 2018, imports accounted for about 75 per cent of global LNG activity on a volume basis.¹ Countries like China, Japan, and South Korea that lack sufficient domestic energy resources have been using a growing amount of natural gas. (See Chart 1.)

¹ BP, *Statistical Review of World Energy 2020, 69th edition.*

Chart 1
Demand for natural gas has more than doubled since 2000
(billion cubic feet per day)



BP, *Statistical Review of World Energy 2020, 69th edition.*



The investment wave

From 2020 to 2064, the proposed direct annual spending of the LNG industry exceeds \$11 billion. (See Table 1.) Of this, \$8 billion per year is invested in the natural gas upstream sector to ensure sufficient annual feedstock and fuel supply. Over \$540 million goes to adding midstream gas processing and natural gas transmission capacity, and over \$2.5 billion annually goes to building and operating LNG facilities themselves.

Total investment over the forecast 45-year construction and operating lifetime would exceed \$500 billion.

Annual spending in the LNG sector of this magnitude would far exceed the average annual spending in recent years by many of B.C.'s existing industries. (See Table 2.) On an annual basis, the LNG under this scenario is forecast to spend as much as B.C.'s three largest industries combined spent annually on average over the past 14 years.

This level of spending would create economic benefits for B.C. and Canada. For Canada as a whole, GDP would increase by \$11 billion per year. British Columbia's GDP would increase by about \$8 billion annually, or just over 3 per cent. This increase is equivalent to the size of the current residential construction sector in the province. Alberta's GDP could see a \$1.6-billion bump, an increase of just over 0.5 per cent. Ontario's GDP could increase by \$1 billion, or just over 0.1 per cent. And smaller gains in GDP would be expected in every other province and territory in Canada. (See Table 3.)

Table 1

B.C. LNG industry investment could generate thousands of jobs and billions in wages

(average annual economic impacts)

	Upstream	Transmission	Midstream	Power lines	LNG Terminal (build)	LNG Terminal (operations)	Total
Annual investment spending (2020 \$ millions)	8,116	308	206	27	1,438	1,151	11,246
Canada							
GDP at market prices (2020 \$ millions)	8,533	266	194	25	1,141	993	11,153
Employment (000s)	71.8	2.6	1.9	0.2	12.5	7.6	96.6
Wages (2020 \$ millions)	4,805	164	123	13	724	472	6,302
British Columbia							
GDP at market prices (2020 \$ millions)	6,138	188	137	20	817	788	8,089
Employment (000s)	52.5	1.9	1.4	0.2	9.3	5.8	71.1
Wages (2020 \$ millions)	3,474	119	90	11	531	364	4,589

Source: The Conference Board of Canada.

While the bulk of the gains would be in the engineering construction, oil and gas extraction, and professional and scientific services sectors, benefits would be widely distributed.

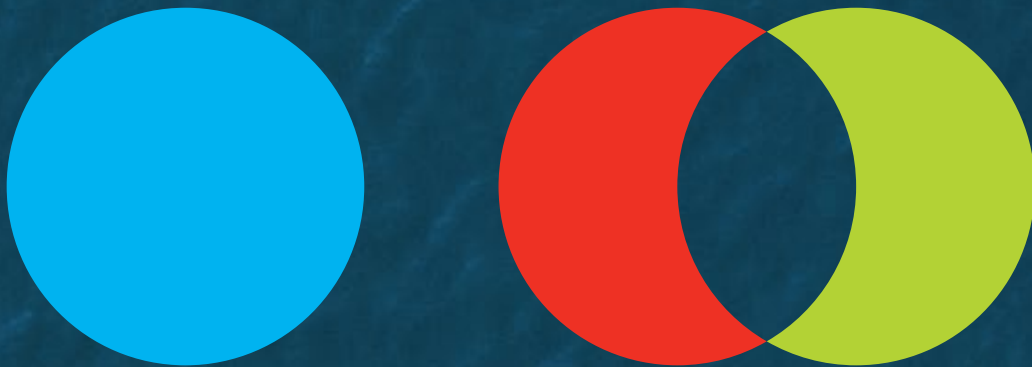


Table 2**B.C. LNG industry capital spending expected to outstrip other sectors**

(average annual capital spending by industry in B.C., 2006–19, \$ millions)

Oil and gas extraction	4,168
Transportation and warehousing	3,685
Utilities	3,324
Public administration	2,903
Real estate and rental and leasing	1,572
Local, municipal, and regional public administration	1,372
Wholesale and retail trade	1,241
Manufacturing (not including wood products and paper manufacturing)	1,229
Mining and quarrying (except oil and gas)	1,215
Information and cultural industries	1,197
Provincial and territorial public administration	1,159
Educational services	1,140
Health care and social assistance	1,132
Finance and insurance	839
Construction	797
Forestry, logging, wood product manufacturing and paper manufacturing	624

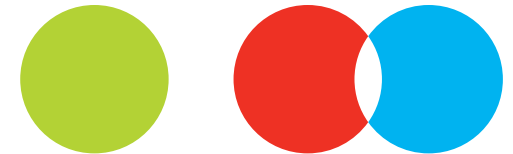
Source: Statistics Canada, Table 34-10-0035-01.

Table 3**B.C. LNG industry could boost GDP and employment**

(GDP, \$ millions; employment, job gains)

	GDP at market prices	Employment
British Columbia	8,089	71,102
Alberta	1,622	9,240
Saskatchewan	79	801
Manitoba	78	1,046
Ontario	1,003	10,804
Quebec	222	2,690
New Brunswick	23	396
Newfoundland & Lab.	8	101
Nova Scotia	15	204
Prince Edward Island	2	36
Nunavut	1	5
Northwest Territories	6	38
Yukon Territory	6	86
Canada	11,153	96,550

Source: The Conference Board of Canada.



GDP impacts would be felt across many sectors. While the bulk of the gains would be in the engineering construction, oil and gas extraction, and professional and scientific services sectors, benefits would be widely distributed. The top three sectors in terms of annual GDP gains among the four provinces seeing the greatest impact include:

- **B.C.:** Engineering construction, \$2.5 billion; mining, quarrying, and oil and gas extraction, \$2.6 billion; professional, scientific, and technical services, about \$1 billion.
- **Alberta:** Mining, quarrying, and oil and gas extraction, over \$800 million; owner-occupied dwellings, about \$140 million; retail and wholesale trade, over \$120 million.
- **Ontario:** Finance, insurance, real estate, rental, and leasing, nearly \$250 million; retail and wholesale trade, \$200 million; manufacturing, over \$110 million.
- **Quebec:** Retail and wholesale trade, \$50 million; manufacturing, over \$40 million; finance, insurance, real estate, rental, and leasing, over \$30 million.

(Full details by province and sector are available in Appendix B.)

The employment wave

B.C.'s LNG industry could also generate significant, stable, long-lived employment impacts in nearly every province and territory in Canada. At the national level, employment could increase by 96,550 annually, with 71,100 of those jobs occurring in British Columbia. To put this in context, as of May 2020, B.C.'s total job count stood at 2,233,900.² The projected average annual increase of over 71,100 jobs represents a 3.2 per cent increase in total provincial employment.



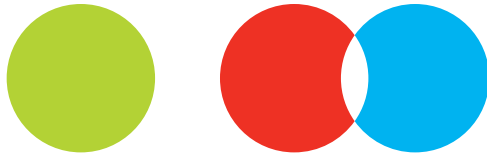
² WorkBC, "Labour Market & Industry."

This level of employment would make the LNG industry one of the largest single-sector employers in the province—larger than forestry, larger than mining, and with nearly double the employment of the residential construction sector.³ The bulk of all jobs created would be high-paying ones in engineering construction; professional, scientific, and technical services; retail and wholesale trade; oil and gas extraction; and manufacturing.

Under this scenario, the employment wave rolls across Canada. Neighbouring Alberta adds more than 9,200 jobs. Ontario sees over 10,800 jobs created. Quebec gets an additional 2,600 jobs. Manitoba gains more than 1,000 jobs. And, Saskatchewan gets more than 800 new jobs.

Wages would also increase under this scenario. Of the \$6.3 billion in average annual wages created, \$4.6 billion are in British Columbia. Alberta wages rise by \$809 million, Ontario by \$628 million, and Quebec by \$140 million. The LNG scenario shows a pan-Canadian impact on the national labour market.

(Full details by province and sector are available in Appendix C.)



³ Statistics Canada, Table 14-10-0202-01.

The government revenue wave

Annual fiscal impacts of the 56-mtpa-LNG scenario include jumps in provincial and federal personal income taxes, provincial and federal corporate income taxes, indirect tax revenues (such as provincial sales and excise taxes), royalty revenues, and carbon tax revenues. (See Table 4.)

Over the 40-year operating life of the scenario, more than \$92 billion in additional revenue could be realized by provinces and territories in Canada. Of this total, over \$78 billion would accrue to British Columbia. On the federal side, related revenue gains would exceed \$64 billion.

Under this scenario, the LNG industry would generate over \$2.3 billion in annual provincial and territorial tax and royalty revenues, with the majority (\$2 billion) going into B.C.'s coffers. This together with natural gas royalties (\$609 million annually) would make the LNG sector one of the largest revenue generators for B.C.'s provincial government. Ontario, Alberta, and Quebec combined could expect more than \$360 million in additional tax revenues annually.

Included in the \$2 billion is an estimated \$458 million in B.C. annual carbon taxes.

At the national level, the LNG scenario could also generate \$1.6 billion in corporate, personal, and indirect taxes annually.

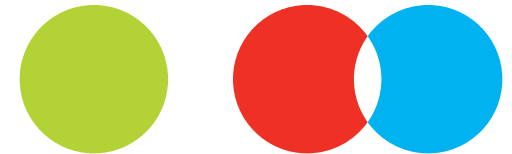
Table 4**B.C. LNG industry could generate billions in revenue for all governments in Canada**

(annual fiscal impacts, \$ millions)

	Total fiscal impact	Corporate income tax	Personal income tax	Indirect tax	B.C. royalty revenue	B.C. carbon tax*
British Columbia	1,957	81	227	582	609	458
Alberta	127	11	53	63		
Saskatchewan	8	1	4	3		
Manitoba	12	1	5	6		
Ontario	140	15	41	84		
Quebec	66	3	19	44		
New Brunswick	3	0	1	1		
Newfoundland & Labrador	1	0	0	1		
Nova Scotia	2	0	1	1		
Prince Edward Island	0	0	0	0		
Nunavut	0	0	0	0		
Northwest Territories	1	0	0	0		
Yukon Territory	0	0	0	0		
Provincial and Territorial total	2,318	113	352	786	609	458
Federal fiscal impact	1,611	166	835	610		

*Note that some carbon tax revenue is immediately recycled.

Sources: The Conference Board of Canada; information provided by Canadian LNG Alliance.



Appendix A

Methodology

This report uses The Conference Board of Canada's interregional, input-output model to produce detailed industry, employment, and supply chain impacts, nationally and across other provinces. The model tracks the impact of supply-chain linkages and additional income generated through changes in wages and profits on the economy, capturing the sum of the direct, indirect, and induced impacts on B.C.'s economy, based on estimated historical relationships. Data were sourced from Statistics Canada, internal Conference Board materials, and directly from parties in the LNG industry in British Columbia.

The scenario identified for analysis was one that sees the development of 56 mtpa of LNG capacity. This total and the economic analysis are based upon the following investment activity assumptions:

- Construction of the 14 mtpa LNG Canada Phase 1 facility and associated Coastal GasLink transmission pipeline that was previously announced and initiated in 2020. The facility will use 20 per cent electrified grid power and 80 per cent gas-fired self-generation. Duration of construction is four years, followed by an operational lifespan of 40 years.
- Construction of a 14 mtpa LNG Canada Phase 2 expansion beginning in 2023. The facility will use 20 per cent electrified grid power and 80 per cent gas-fired self-generation. The addition of six compressor stations to the Coastal GasLink pipeline will help to support gas supply. Duration of construction is four years, followed by an operational lifespan of 40 years.
- Construction of an 18 mtpa LNG plant in northwestern B.C., beginning in 2024. Twelve mtpa are to be built starting in 2024, with an additional 6 mtpa to be built starting in 2029. The project is 100 per cent electrified, using power from the B.C. power grid. Duration of construction is five years, followed by an operational lifespan of 40 years.
- Construction of a new 550-kilometre, 4-billion cubic feet per day natural gas pipeline to serve the above facility. Three-year construction period beginning in 2025. Project is 100 per cent electrified using power from the B.C. power grid.
- Construction of a 4 mtpa LNG facility in northwestern B.C., beginning in 2024. Construction of a 2.1 mtpa facility in the B.C. lower mainland beginning in 2025, and construction of a 4 mtpa facility in the B.C. lower mainland beginning in 2027. These facilities will be 100 per cent electrified using power from the B.C. power grid and will be connected to existing pipeline infrastructure to source natural gas needs. Duration of construction is four years, followed by an operational lifespan of 40 years.
- All necessary incremental upstream drilling and midstream processing capacity to provide required natural gas feedstock and fuel supply for the projected facilities is assumed to have a moderate level of electrification and will meet new methane regulations.
- Natural gas to come from wells in the Montney Basin.
- Construction of a new pipeline to support LNG development is 100 per cent electrified, using power from the B.C. power grid. Duration of construction is four years.
- Construction of new 500-kilovolt electricity transmission line from Prince George to the B.C. north coast beginning in 2024 to deliver electricity needed for the projected facilities. Duration of construction is five years.

Appendix B

Annual GDP impacts by province, territory, and sector

Table 1
B.C. LNG industry could boost Canada's GDP by over \$11 billion
 (annual GDP impacts, 2020 \$ millions)

	Canada	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	New Brunswick	Newfoundland & Labrador	Nova Scotia	Prince Edward Island	Nunavut	Northwest Territories	Yukon Territory
Total	11,153	8,089	1,622	79	78	1,003	222	23	8	15	2	1	6	6
Engineering construction	2,554	2,554	0	0	0	0	0	0	0	0	0	0	0	0
Mining, quarrying, and oil and gas extraction	2,624	1,773	808	8	1	25	5	0	0	0	0	0	2	1
Professional, scientific, and technical services	997	778	87	5	11	94	17	2	1	2	0	0	0	1
Finance, insurance, real estate, rental, leasing	922	534	82	9	14	247	32	1	1	2	0	0	1	1
Retail and wholesale trade	940	523	123	16	12	203	51	5	2	3	0	0	0	1
Transportation and warehousing	557	400	71	4	9	52	15	1	1	1	0	0	2	1
Manufacturing	694	373	119	22	13	115	44	3	1	3	0	0	0	0
Owner-occupied dwellings	502	357	139	1	1	4	1	0	0	0	0	0	0	0
Administration and support, waste management, remediation services	266	121	25	2	5	84	21	7	1	1	0	0	0	0
Utilities	218	112	32	1	2	63	7	0	0	0	0	0	0	0
Information, culture, arts, recreation	204	112	14	3	3	52	16	1	1	1	0	0	0	0
Accommodation and food services	136	91	25	2	2	10	2	1	1	1	0	0	0	0
Repair, non-residential, and other construction activities	120	90	23	0	1	5	0	0	0	0	0	0	0	0
Other services (except public administration)	107	70	19	2	1	11	3	0	0	0	0	0	0	0
Health care, social assistance, government health services	85	57	17	1	1	8	1	0	0	0	0	0	0	0
Other provincial, territorial, and municipal government services	81	51	13	2	1	10	3	1	0	0	0	0	0	0
Government and other education services	69	50	9	1	0	7	1	0	0	1	0	0	0	0
Agriculture, forestry, fishing, farming, hunting	35	19	10	1	1	3	1	0	0	0	0	0	0	0
Non-profit institutions serving households	23	15	3	0	0	2	1	0	0	0	0	0	0	0
Other federal government services	19	9	1	0	0	7	1	0	0	0	0	0	0	0

Source: The Conference Board of Canada

© The Conference Board of Canada. All rights reserved. Please contact cboc.ca/td with questions or concerns about the use of this material.



Appendix C

Average annual labour impacts by province, territory, and sector

Table 2

B.C. LNG industry could boost wages by over \$6 billion and be concentrated in higher wage jobs

(average annual labour impacts, jobs, 000s)

	Total employment	Engineering construction	Professional, scientific, and technical services	Retail and wholesale trade	Mining, quarrying, and oil and gas extraction	Manufacturing	Transportation and warehousing	Finance, insurance, real estate, rental, leasing	Accommodation and food services	Admin. and support, waste management, remediation	Health care, social assistance, and other services	Information, culture, arts, and recreation	Repair construction	All others not elsewhere specified
British Columbia	71.1	24.5	10.6	8.5	4.5	4.0	3.5	3.5	3.0	2.2	2.2	1.4	0.7	2.5
Alberta	9.2	0.0	0.6	1.5	3.2	0.6	0.5	0.4	0.6	0.3	0.5	0.2	0.2	0.7
Saskatchewan	0.8	0.0	0.0	0.2	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Manitoba	1.0	0.0	0.1	0.2	0.0	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0
Ontario	10.8	0.0	1.1	2.9	0.2	1.1	0.6	1.7	0.3	1.6	0.3	0.4	0.0	0.5
Quebec	2.7	0.0	0.2	0.8	0.0	0.5	0.2	0.3	0.1	0.3	0.1	0.1	0.0	0.1
New Brunswick	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Newfoundland & Labrador	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nova Scotia	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prince Edward Island	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nunavut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northwest Territories	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yukon Territory	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	96.6	24.5	12.8	14.3	7.9	6.7	5.0	6.1	4.3	4.6	3.2	2.2	1.0	3.9

Source: The Conference Board of Canada



Appendix D

Bibliography

BP. *Statistical Review of World Energy 2019, 68th edition*. London: BP, 2019. Accessed June 15, 2020. <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf>.

Canada Energy Regulator. *Canada's Role in the Global LNG Market: Energy Market—July 2017*. Calgary: National Energy Board, 2017.

International Gas Union. *2020 World LNG Report*. Barcelona: International Gas Union, 2020. <https://www.igu.org/publications-page>.

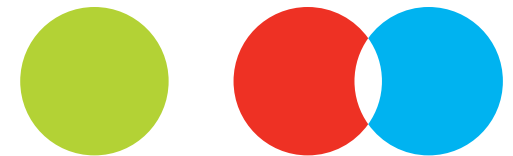
Midcontinent Independent System Operator. "Transmission Cost Estimation Guide MTEP19." Accessed July 8, 2020. <https://www.misoenergy.org/planning/planning/>.

Nie, Yuhao, and others. "Greenhouse-Gas Emission of Canadian Liquefied Natural Gas for Use in China: Comparison and Synthesis of Three Independent Life Cycle Assessments." *Journal of Cleaner Production* 258, no. 10 (June 2020). <https://www.sciencedirect.com/science/article/abs/pii/S0959652620307484>.

Statistics Canada. Table 14-10-0202-01, Employment by industry, annual. Accessed July 8, 2020. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020201>.

—. Table 34-10-0035-01, Capital and repair expenditures, non-residential tangible assets, by industry and geography. Accessed July 8, 2020. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410003501>.

WorkBC. "Labour Market & Industry." Accessed July 8, 2020. <https://www.workbc.ca/labour-market-information/regional-profiles/british-columbia>.



Acknowledgements

This issue briefing was prepared by the Sustainability Knowledge Centre at The Conference Board of Canada. Research and writing completed by Bryan Gormley, Consultant, and Sam Goucher, Senior Economist. Roger Francis, Director, and Michael Burt, Executive Director, contributed input and completed internal reviews.

Funding was provided by the Canadian LNG Alliance (formerly the BC LNG Alliance).

The findings and conclusions in this briefing are entirely those of The Conference Board of Canada. Any errors or omissions in fact remain the sole responsibility of The Conference Board of Canada.

A Rising Tide: The Economic Impact of B.C.'s Liquefied Natural Gas Industry

Bryan Gormley

To cite this research: Gormley, Bryan. *A Rising Tide: The Economic Impact of B.C.'s Liquefied Natural Gas Industry*. Ottawa: The Conference Board of Canada, 2020.

©2020 The Conference Board of Canada*

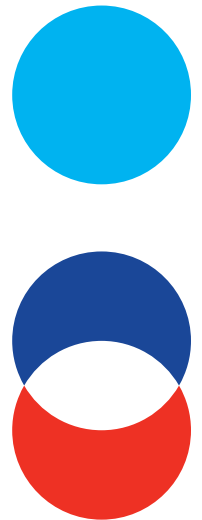
Published in Canada | All rights reserved | Agreement No. 40063028 | *Incorporated as AERIC Inc.

An accessible version of this document for the visually impaired is available upon request.

Accessibility Officer, The Conference Board of Canada Tel.: 613-526-3280 or 1-866-711-2262

E-mail: accessibility@conferenceboard.ca

®The Conference Board of Canada and the torch logo are registered trademarks of The Conference Board, Inc. Forecasts and research often involve numerous assumptions and data sources, and are subject to inherent risks and uncertainties. This information is not intended as specific investment, accounting, legal, or tax advice. The findings and conclusions of this report do not necessarily reflect the views of the external reviewers, advisors, or investors. Any errors or omissions in fact or interpretation remain the sole responsibility of The Conference Board of Canada.





Where insights meet impact

**The Conference
Board of Canada**

Publication: 10763
Price: Complimentary
conferenceboard.ca