

29 BENEFITS TO CANADIANS

29.1 Changes to the Project Since Initially Proposed

Key changes to the Project since initially proposed are detailed in Section 2.1.3 (Project Design Mitigation and Changes). These changes and their benefits are summarized in Table 29-1.

Table 29-1: Benefits of Project Changes

Project Feature	Project Change	Benefits of Change
Site layout	A vegetated riparian buffer will be maintained that extends 30 m inland from the high-water mark around Lelu Island.	<ul style="list-style-type: none"> ▪ Avoids removal of culturally modified trees ▪ Provides visual barrier for the Project ▪ Maintains habitat on Lelu Island ▪ Protects a red-listed estuarine plant community
Siting of main flare stack	Moved to southeast location	<ul style="list-style-type: none"> ▪ Mitigates potential visual quality, ambient light, and acoustic effects
Gas turbines	Switched from industrial gas turbines to aero-derivative gas turbines	<ul style="list-style-type: none"> ▪ Reduces greenhouse gas and air emissions
Bunker fuel	Bunker refuelling removed	<ul style="list-style-type: none"> ▪ Eliminates risk of bunker fuel spill while refuelling ▪ Eliminates potential effect on marine and terrestrial species and habitats
Propane use and storage	Propane use and storage removed from the project design	<ul style="list-style-type: none"> ▪ Reduces the quantity of hazardous materials stored onsite ▪ Reduces the complexity and safety risks associated with unloading of propane from marine vessels ▪ Reduces marine traffic
Marine terminal	Shortened from 2.7 km to 2.4 km	<ul style="list-style-type: none"> ▪ Reduces navigational effects of terminal ▪ Makes liquefied natural gas (LNG) carrier loading safer
Marine terminal	Increased clearance near Lelu Island to 11 m	<ul style="list-style-type: none"> ▪ Allows passage of gillnetters and smaller vessels ▪ Reduces navigational effects of terminal
Bridge from Lelu Island to mainland	Increased clearance to 11 m	<ul style="list-style-type: none"> ▪ Allows passage of gillnetters and smaller vessels ▪ Reduces navigational effects of the bridge

29.2 Benefits of the Project

The project benefits to Canada and British Columbia (BC) are summarized in the following sections. The project cost estimates are based on a Class 5 engineering estimate, which is considered accurate to within $\pm 40\%$, for a facility capable of producing 12.8 million tonnes per annum (MTPA) of LNG, which represents Phase 1 of the Project. The economic effects for project expansion to 19.2 MTPA have not been assessed as the timeline for expansion and the incremental costs of expansion are not yet available. The estimates of project effects on employment, government revenues, and economic output (gross domestic product or GDP) were developed through custom runs of the Statistics Canada Interprovincial Input/Output Model (SCIPIOM) using project construction and operations cost information.

29.2.1 Capital Costs

Construction of a facility capable of producing 12.8 MTPA of LNG is estimated to cost US\$11 billion (2013 dollars). Based on a Canada/US exchange rate of CDN\$1.04/US\$1, this would be equivalent to CDN\$11.4 billion (2013 dollars). Key components of the cost estimate are provided in Figure 29-1. Sixty percent of the cost relates to the material, equipment, and labour required by the prime contractor to assemble the LNG plant. Another 20% of cost is related to subcontracts for site preparation and constructing the marine facilities (jetty and bridge), storage tanks, and buildings. The other 20% consists of owner's and other costs.

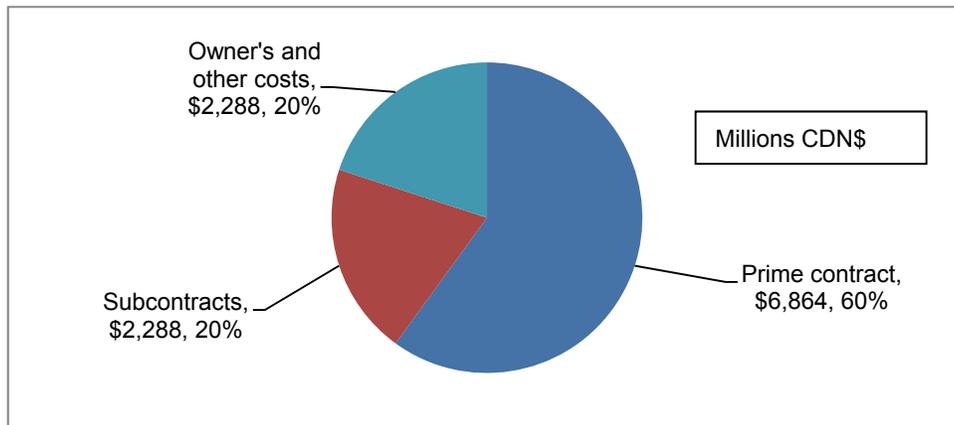


Figure 29-1: Major Components of the Project Capital Cost

Because of the specialized nature of the LNG facility, it is expected that much of the materials and some of the specialized labour for the Project will be imported. Overall, it is estimated that 32% of the labour, goods, and services required for engineering, procurement, construction, and commissioning (EPC) will be procured from Canadian sources. This represents a total expenditure of \$3.4 billion. Components of project construction with a high Canadian content include subcontracts for site preparation, constructing the bridge and buildings, and operating the construction camp. Figure 29-2 shows the types of goods and services to be purchased in Canada.

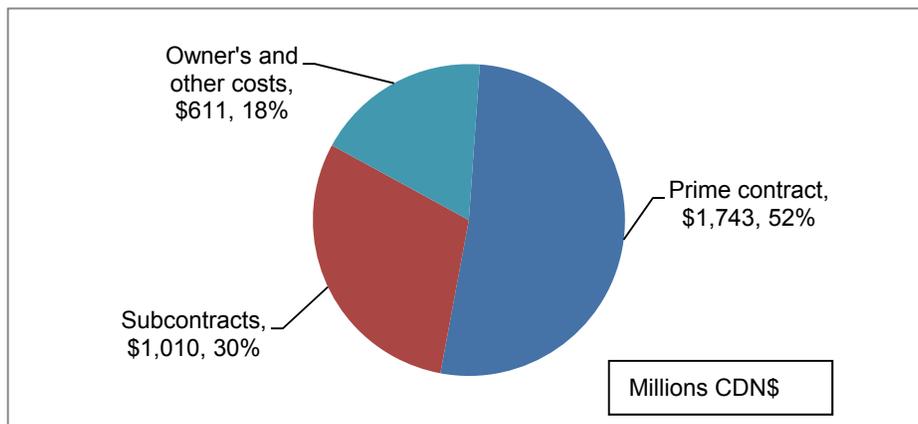


Figure 29-2: Major Components of Project Capital Cost Spent in Canada

29.2.2 Operating and Decommissioning Costs

Annual operating costs over the life of the Project will be about \$2.8 billion. The natural gas needed for project construction, including the cost of transporting the natural gas to the LNG facility, will account for 54% of costs. Various municipal, provincial, and federal taxes, direct labour, and maintenance costs will account for the other 46% of costs. It is expected that 87% of the labour, goods, and services needed to operate the facility will come from Canadian sources. This represents average annual spending in Canada of \$2.5 billion (2013 dollars).

Capital costs associated with the decommissioning of the Project are not currently known as costs will depend on decommissioning requirements at cessation of operations (expected to be over 30 years in the future). Decommissioning requirements will be part of the conditions of the lease agreement with PRPA, which have not yet been finalized.

29.2.3 Employment Estimates

29.2.3.1 Construction

Project construction is to occur over five years, from 2015 through 2019, with nearly 4,000 workers being employed during the peak construction season. Project construction will require an estimated 13,000 person-years (PYs) of direct labour, of which 95% will consist of onsite construction labour and the other 5% will consist of project management. Figure 29-3 provides estimates of the number of people who will be employed each year.

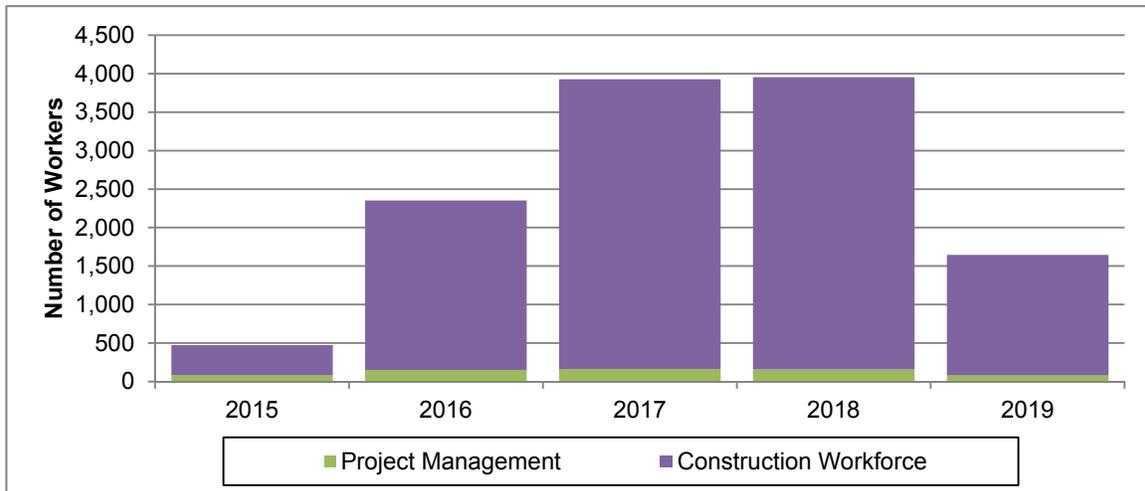


Figure 29-3: Construction Labour Force Requirements by Year

According to the BC Natural Gas Workforce Strategy Committee (2013), 57% of the peak workforce will consist of trades people, 25% will be trades helpers and labourers, 3% will be heavy equipment operators, 2% will be truck drivers and operators, 1% will be engineers, 1% will be managers, supervisors, and forepersons, and the balance (11%) will consist of a variety of other occupations. According to Pacific NorthWest LNG Limited Partnership (PNW LNG), Canadian workers will account for 70% of the onsite workforce for the first three years of construction. Due to competition for labour from other projects, Canadian workers may account

for 30% of the onsite workforce for the remaining two years of construction. Overall, Canadian workers will account for 62% of the onsite workforce, and this represents about 8,000 PYs of construction work. During peak construction, there will be about 2,450 Canadian workers on the construction site.

The direct, indirect, and induced employment that would result in Canada from project construction is provided in Table 29-2. These estimates are based on the results of the SCIPOM run using the estimates of project spending in Canada.

Table 29-2: Estimates of Construction Employment

Employment	Canada (PYs)	British Columbia (PYs)
Direct	8,000	8,000
Indirect	18,890	8,655
Induced	11,045	5,995
Total	37,935	22,650
Percent of Total	100%	60

The table shows that, for every direct PY, there would about 1.4 indirect PYs of employment in Canadian businesses that would be called upon to provide goods and services needed for project construction. Table 29-2 shows that 60% of indirect employment would occur in BC. The amount of induced employment associated with project construction is also shown in Table 29-2. Induced employment results from consumer spending by people who are directly and indirectly employed on project construction. For Canada, there would be 0.4 PYs of induced employment for every direct and indirect PY, and 54% of induced employment would be in BC.

Overall, project construction is expected to provide 37,935 PYs of employment for Canadians over the five-year construction period (see Table 29-2). This represents an average of 7,587 PYs per year. The Project is also expected to create 22,650 PYs of employment in BC; this is equivalent to 4,530 PYs per year of construction and represents 60% of total Canadian employment effects (see Table 29-2).

The amount of income to be earned by Canadian workers during project construction will depend on what types of jobs they take and the associated wage rates. A 2013 Grant Thornton study assumed average annual compensation of \$140,200 for specialized construction workers on LNG projects, based on estimates provided by the Province of BC and its advisors. This is substantially higher than the average for the construction industry in BC, where the average wage in 2013 was \$26.30 (BC Stats 2014), or the equivalent of \$56,400 per year based on 2,080 hours per year. On average, it is estimated that workers directly employed on project construction would earn \$115,100 per year. Based on the results of the SCIPOM, workers who would be indirectly employed during project construction would receive annual compensation of \$62,425, and the compensation for workers who benefit from induced employment would be \$45,496.

29.2.3.2 Operations

Project operations are assumed to directly employ 464 people over the 30-year (minimum) operating life (see Section 14.5.2.1). Of these, 130 will be operations staff based in Vancouver, and the other 334 will be located in the regional assessment area, which includes the City of Prince Rupert, the District Municipality of Port Edward, Skeena-Queen Charlotte Regional District Electoral Areas A and C, the Lax Kw'alaams Indian Reserve (IR) 1, the S1/2 Tsimpsean IR 2, and the Dolphin Island 1 IR (see Section 14). The onsite staff will include 29 managers (9% of the total), 147 (44%) workers employed on a daily basis for maintenance and technical services jobs, 109 (33%) workers employed as shift workers doing operations and security, and 49 (15%) workers in administrative positions. In addition, an estimated 186 other people would be employed by contractors for facility maintenance. Thus, the Project will directly employ 650 workers per year during operations, and it is expected that most of these workers would be or would become Canadian residents.

The direct, indirect, and induced employment that would result in Canada from project operation is provided in Table 29-3. These estimates are based on the results of the SCIPIOM run using the estimates of project operational spending in Canada. The table shows the indirect and induced employment associated with operating the LNG plant as well as the indirect and induced effects of purchasing and transporting natural gas required. It shows that, for every direct employment job, there would about 6.5 indirect jobs in Canadian businesses that would provide the goods and services needed for project operation. This ratio is quite high and this is because 6.2 of these indirect jobs are associated with purchasing natural gas and transporting it from fields in Northeast BC to the LNG facility near Prince Rupert. As a result, the Project is expected to create 2,760 indirect jobs in natural gas exploration and production in BC and includes all of the labour force that would be required to operate the Prince Rupert Gas Transmission pipeline.

Table 29-3 shows that 70% of indirect employment effects would occur in BC. The amount of induced employment associated with project construction is also shown in Table 29-3. Induced employment results from consumer spending by people who are directly and indirectly employed on project operation. For Canada, there would be 0.4 induced jobs for every direct and indirect job and 61% of induced employment would be in BC.

Table 29-3: Operations Employment

Employment	Canada (Jobs)			British Columbia (Jobs)		
	Facility Operations	Natural Gas	Total	Facility Operations	Natural Gas	Total
Direct	650	0	650	650	0	650
Indirect	200	4,005	4,205	155	2,760	2,915
Induced	525	1,505	2,030	395	845	1,240
Total	1,375	5,510	6,885	1,200	3,605	4,805
Percent of Total	20%	80%	100%	25%	75%	100%

Employment during project operations would also result in high incomes for project workers. Grant Thornton (2013) assumed average annual compensation of \$127,200 for people directly employed on LNG projects. The results of the SCIPOM predict average incomes of \$67,750 for people with indirect employment associated with LNG projects and \$45,470 for workers who benefit from induced employment (as a result of an LNG project). The estimated income for indirect employment is relatively high because the estimates include wages for people who are indirectly employed in oil and gas exploration and pipeline transportation.

29.2.4 Contractor Supply Service Estimates

29.2.4.1 Construction

As noted in Figure 29-2, construction of the Project would be done by a prime contractor with subcontracts being issued for selected components of the Project, such as construction of the jetty, the bridge, the storage tanks, and buildings, and site preparation. A preliminary estimate of \$1,743 million related to the prime contract would be spent in Canada, as would \$1,010 million in subcontracts.

The SCIPOM results indicate which industries, both nationally and provincially, would be likely to be most affected through the purchases of goods and services required for project construction. Figure 29-4 shows the most important commodities from Canadian sources that would be required for project construction. The total value of commodities required for project construction from Canadian sources (economic output), including the value of intermediate goods required to produce the \$3.4 billion in goods and services from Canadian sources, is estimated to be \$5,745 million. The figure shows that the largest contracts will be for services related to engineering construction; this represents 43% of the total value of goods and services required for construction. Large contracts will also be issued for other engineering construction (33% of the total) which includes contracts for clearing and site preparation. Contracts for professional services (EPCC) will account for 3% of the total. Wholesale margins (which represent that portion of the value of wholesale goods that is retained by the distributors) and transportation each accounts for another 2% of the total.

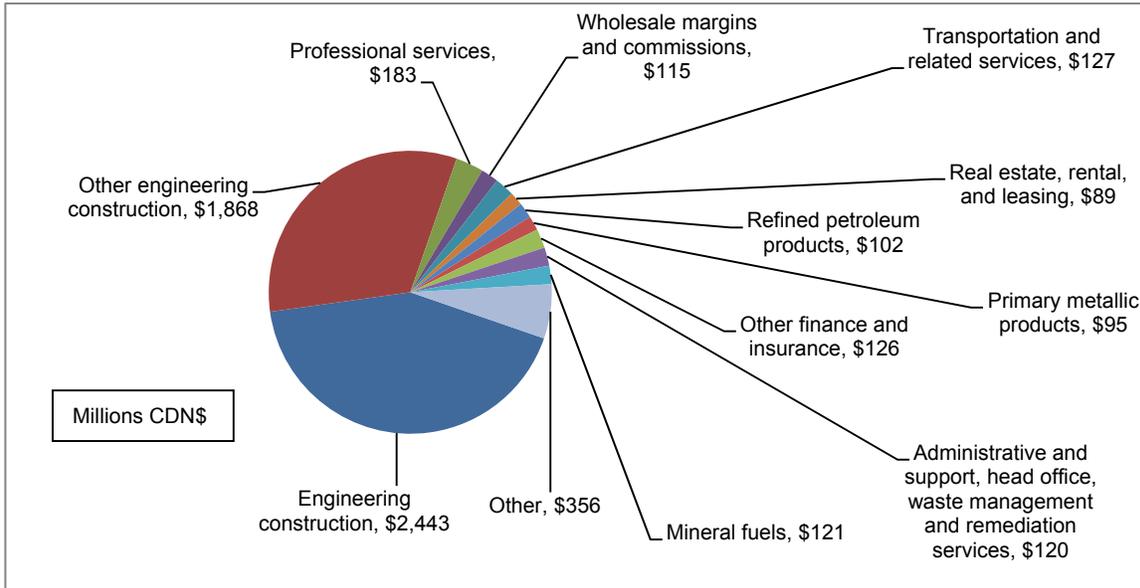


Figure 29-4: Value of Contracted Commodities from Canadian Sources Needed for Project Construction

For BC, the SCIPIOM estimates that the total value of commodities required for project construction, including intermediate goods, will be \$3,528 million. Figure 29-5 shows the commodities that will be acquired from BC sources. The largest contracts will be for services related to engineering construction; this represents 69% of the total value of commodities required for construction. Contracts for other engineering construction will account for 19% for professional services, while contracts for professional services (engineering, procurement, and construction management) will account for 2% of the total. Wholesale margins will account for 3% while transportation, other finance and insurance and real estate and rentals will each account for another 1% of the total.

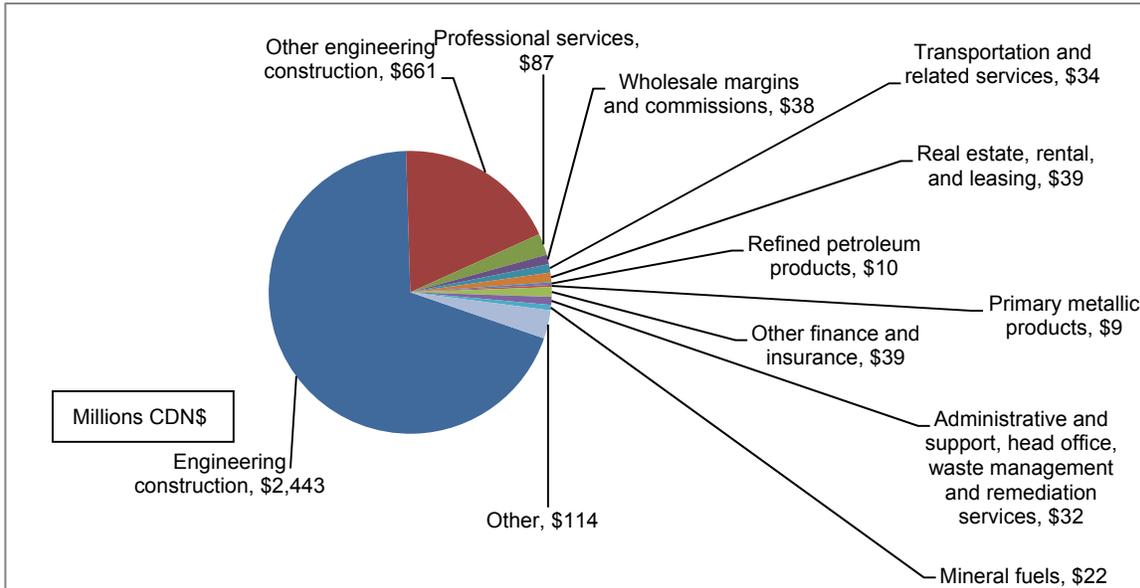


Figure 29-5: Value of Contracted Commodities from British Columbia Sources Needed for Project Construction

29.2.4.2 Operations

Most of the costs of project operations will relate to the purchase of natural gas and the costs of transporting the natural gas from the source in northeast BC to the LNG facility near Prince Rupert. The key contract opportunities for project operation relate to repair and maintenance services. The cost of these services is estimated to be \$141 million per year of which \$65 million is expected to be procured from Canadian sources, including 85% of machinery and parts and 30% of labour. While there will be purchases of other goods and services needed to operate the Project, these will be relatively small in comparison to the overall operational budget.

29.2.5 Government Revenues

29.2.5.1 Construction

During construction, sources of revenue will include corporate taxes on contractors' profits, income taxes paid by workers directly employed on project construction, and sales taxes paid on goods and services purchased from Canadian suppliers. Table 29-4 summarizes the expected tax revenues for Canada and BC, with the estimates being based largely on the results of the SCIPIOM. Corporate taxes were estimated assuming a federal corporate tax rate of 15% and a BC tax rate of 11%, and applying these against estimated net corporate profits, which were calculated as GDP minus labour income minus taxes and adjusted downward to account for carrying charges and pre-tax costs. Personal income taxes were estimated using the SCIPIOM estimates of labour income multiplied by federal and provincial income tax rates that reflect the average rates of taxation in 2011 (Canadian Revenue Agency 2013).

The results show that, over the five-year construction period, the Government of Canada will receive approximately \$500 million, of which most (65%) will come from personal income taxes and 20% will come from corporate income taxes. More than one-third of revenues for the Government of Canada will come from indirect project effects (38%) while another 37% will come from induced effects. On average, the Government of Canada will receive \$100 million in revenues for each year of the construction period.

Table 29-4: Government Revenues from Project Construction

Revenue Source		Revenues (\$ millions)			
		Direct	Indirect	Induced	Total
Canada	Corporate Income Tax	21	21	58	100
	Personal Income Tax	104	157	62	323
	GST		2	45	47
	Other Federal Taxes		11	20	31
	Total	125	191	184	500
British Columbia	Corporate Income Tax	15	3	24	42
	Personal Income Tax	42	25	13	80
	PST	265	24	25	313
	Other Provincial Taxes		8	34	42
	Total	323	60	95	477

Note: Totals may not add due to rounding

Total revenues for the Government of BC during project construction will amount to \$477 million, with 66% coming from the PST, 17% from personal income taxes, 9% from other provincial taxes and 9% from corporate taxes. On average, the Government of BC will receive \$95 million in annual revenues from project-related economic activities during the construction phase.

29.2.5.2 Operations

During operations, sources of revenue will include corporate taxes on profits, income taxes paid by workers directly employed on project construction, and sales taxes paid on goods and services purchased from Canadian suppliers. There will also be revenues from the carbon tax levied by the Province of BC as well as municipal property taxes. Table 29-5 summarizes the expected tax revenues for Canada and BC and municipal governments, with the estimates also being based largely on the results of the SCIPOM, although estimates of corporate, property, and carbon taxes were provided directly by PNW LNG. Indirect and induced corporate taxes were estimated assuming a federal corporate tax rate of 15% and a BC tax rate of 11%, and applying these against estimated corporate profits, which were calculated as GDP minus labour income minus taxes and adjusted downward to account for carrying charges and pre-tax costs. Personal income taxes were estimated using the SCIPOM estimates of labour income multiplied by federal and provincial income tax rates that reflect the average rates of taxation per unit of total income in 2011 (Canadian Revenue Agency 2013).

On an annual basis, the Government of Canada will receive approximately \$638 million, of which 77% will come from corporate income taxes paid directly by PNW LNG (\$489 million). Revenues from personal income tax will account for 9% of the total while revenue from GST and other federal taxes will account for 4% of the total.

Table 29-5: Annual Government Revenues from Project Operations

Revenue Source		Revenues (CDN\$ millions)			
		Direct	Indirect	Induced	Total
Canada	Corporate Income Tax	489	61	10	560
	Personal Income Tax	9	34	11	55
	GST		10	8	18
	Other Federal Taxes		1	3	5
	Total	498	107	33	638
British Columbia	Corporate Income Tax	364	39	5	408
	Personal Income Tax	4	9	3	16
	PST		80	5	85
	Carbon	104			104
	Other Provincial Taxes	29	108	7	144
	Total	501	236	20	757
Municipal	Municipal taxes (BC)	15	0	0	15

Note: Totals may not add due to rounding

Annual revenues for the Government of BC during project operation will amount to \$757 million. These estimates do not include possible revenues from the LNG tax structure and regulatory regime that will be included in the BC Government's 2014 budget. Approximately 48% will come from corporate profits paid directly by PNW LNG (\$364 million) with another 14% coming from carbon tax payments made by PNW LNG. PST will account for 11% of annual provincial revenues, while personal income taxes will account for 2% and other provincial taxes (including fuel taxes) will account for 19%.

Annual property and other local and regional taxes paid by PNW LNG are estimated to be approximately \$15 million per year.

29.2.6 Contribution to the British Columbia Economy

Table 29-6 provides an estimate of project effects on economic output in BC as measured in terms of GDP, as measured in terms of basic prices (i.e., less taxes and subsidies), based on the results of the SCIPOM. It is estimated that project purchases of labour, goods, and services needed for construction would increase GDP in BC by \$2,387 million over the five-year construction period. This represents an average of about \$477 million per year. Direct project effects account for 21% of total effects on provincial GDP.

Table 29-6: Project Effects on British Columbia Gross Domestic Product

Effect	Total Construction (\$ millions)	Annual Operations (\$ million)
Direct	1,160	1,193
Indirect	589	812
Induced	638	133
Total	2,387	2,138

During operations, the Project is expected to contribute about \$2,138 million per year to provincial GDP. Direct effects account for 56% of total effects, and this relates to the large amount of taxes paid to the provincial government as well as the royalties included in the cost of natural gas used by the Project.

29.2.7 Contribution to the Canadian Economy

Table 29-7 provides an estimate of project effects on GDP in Canada as measured in terms of basic prices, as per the results of the SCIPOM. It is estimated that project purchases of labour, goods, and services needed for construction would increase GDP in Canada by \$3,990 million over the five-year construction period. This represents an average of about \$798 million per year. Direct project effects account for 29% of total effects on Canadian GDP.

Table 29-7: Project Effects on Canadian Gross Domestic Product

Effect	Total Construction (\$ millions)	Annual Operations (CDN\$ million)
Direct	1,160	1,193
Indirect	1,632	998
Induced	1,198	216
Total	3,990	2,407

During operations, the Project is expected to contribute about \$2,407 million per year to Canadian GDP. Direct effects account for 50% of total effects.

29.2.8 Contribution to Community Development

In addition to meeting industrial development and land use plans for Lelu Island (as outlined in Port Edward's Official Community Plan 2013), the Project will be beneficial to Canadians through the development of project-lead programs and initiatives in Port Edward and Prince Rupert. PNW LNG has committed to the following mitigations and programs that will positively contribute to community development:

- The establishment of a mutual aid agreement between the Project and Prince Rupert Fire Rescue and the Port Edward Fire Department. The mutual aid agreement will result in increased capacity during emergency situations and through LNG specific firefighting education and training will increase the skill set and competency of local firefighters.

- The development of a First Nations and Community Training and Employment Strategy. The strategy will ensure that local communities, including First Nations, have access to training and employment opportunities provided by the Project. The long-term objective is to maximize access to long-term career opportunities on the part of local populations during the operations phase of the Project.
- The development of social management plans to promote positive mental and physical health of workers. Plan development will be facilitated by a full-time corporate social responsibility team that will work to establish programs that will have beneficial effects on the overall health and well-being of families and communities in Port Edward and Prince Rupert.
- Where applicable, PNW LNG has committed to repairing or rebuilding sections of Highway 599R (Skeena Drive) where quality of the road surface has been negatively affected by construction activity.
- Improvements (increases) to the capacity of the Port Edward Water Treatment and Wastewater Treatment Plants.

29.3 References

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