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## Pacific Northwest LNG Implications

### Analysis of environmental impacts and the project development agreement

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#### Context

The Pacific Northwest LNG project is proposed for Lelu Island near Prince Rupert in northwest British Columbia. The provincial legislature will return on July 14 to debate an agreement that the government intends to sign, preventing future governments from changing specific environmental and taxation policies that relate to the project.

This backgrounder provides:

- An estimation of the environmental implications of developing the project and the associated shale gas activity
- An examination of the clauses in the project development agreement relating to climate change policy

#### Environmental impacts

If the project proceeds, the impacts in B.C. would include those at the site of the terminal, such as potential damage to salmon habitat at Flora Bank, and the carbon pollution associated with liquefying natural gas. Moving up the supply chain, the project would be supplied gas by the 900-kilometre Prince Rupert Gas Transmission pipeline proposed by TransCanada. That pipeline would connect the project with gas fields in northeast B.C. and Alberta. That upstream infrastructure and activity would result in additional environmental impacts.

Using the B.C. Shale Scenario Tool,<sup>1</sup> we have estimated the potential carbon pollution, water use, and wastewater impacts associated with the project, as well as related pipelines and shale gas development. The assumptions underlying these estimates are available in the appendix.

Figure 1 (on the following page) shows how many gas wells would need to be drilled to supply the project with gas, assuming that both phases of the project proceed relying on current environmental technologies and practices. The peak of activity would be 842 new wells drilled in 2020. This activity, and the associated impacts, would be in addition to the drilling needed to support other liquefied natural gas (LNG) projects and other non-LNG uses of gas. For context, 565 new gas wells were drilled in B.C. in 2013.<sup>2</sup>

Based on the same assumptions, Table 1 provides estimates of the carbon pollution, water use for fracking and wastewater produced in 2030 by the project and its upstream development. For context, B.C.'s 2020 and 2050 climate targets are 43 megatonnes and 13 Mt of carbon pollution per year, respectively.

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<sup>1</sup> The estimated levels of activity and environmental impacts in this backgrounder are calculated using the Pembina Institute's B.C. Shale Scenario Tool (developed with modelling support from Navius Research) available at <http://www.pembina.org/pub/BCShaleTool>

<sup>2</sup> BC Oil and Gas Commission, *Hydrocarbon and By-Product Reserves in British Columbia* (2013). <https://www.bcogc.ca/node/12346/download>

Figure 1: New and cumulative wells drilled to supply Pacific Northwest LNG (phases 1 and 2) assuming current technologies and practices

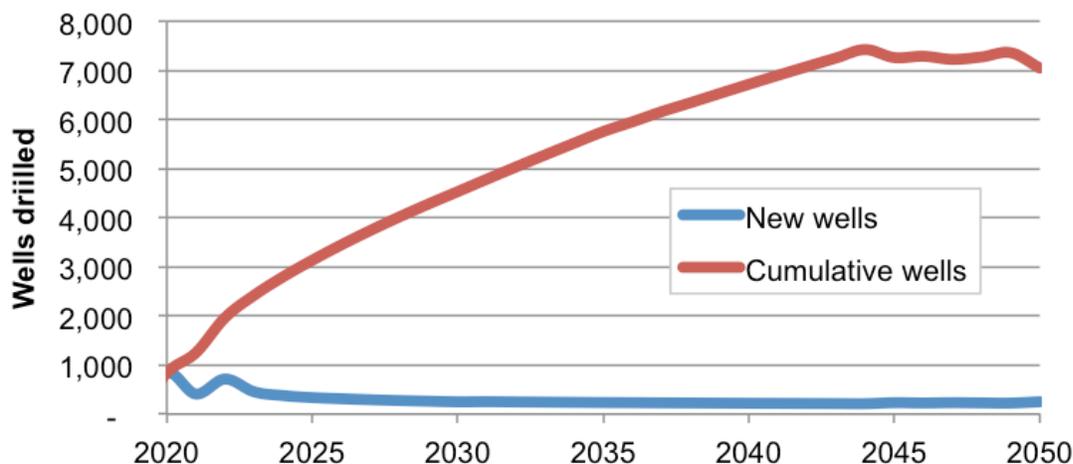


Table 1: Environmental impacts for Pacific Northwest LNG (phases 1 and 2) assuming current environmental technologies and practices

Environmental impact	Estimate for 2030
Carbon pollution in B.C. (Mt CO <sub>2</sub> e)	10.7 (100%)
From LNG terminals (Mt CO <sub>2</sub> e)	4.2 (39%)
From upstream development (Mt CO <sub>2</sub> e)	6.5 (61%)
Fresh water used for fracking (million m <sup>3</sup> )	5.1
Total wastewater to be disposed (million m <sup>3</sup> )	1.8

The environmental impacts are not fixed. Decisions about the scale of development, where the gas is developed and the technologies and practices used to develop it have important implications for land, water and carbon impacts. Table 2 summarizes the impacts associated with the project, assuming significant improvements to environmental technologies and practices.<sup>3</sup> The results show that carbon pollution, water use and wastewater in 2030 would be lower by 48%, 49% and 66% respectively.

Table 2: Environmental impacts for Pacific Northwest LNG (phase 1 and 2) assuming significant improvements to environmental technologies and practices

Environmental Impact	Estimate for 2030
Carbon pollution in B.C. (Mt CO <sub>2</sub> e)	5.5 (100%)
From LNG terminals (Mt CO <sub>2</sub> e)	2.1 (38%)
From upstream development (Mt CO <sub>2</sub> e)	3.4 (62%)
Fresh water used for fracking (million m <sup>3</sup> )	2.6
Total wastewater to be disposed (million m <sup>3</sup> )	0.6

<sup>3</sup> The details of these improvements are available in the appendix.

## Project development agreements and climate change

In May, the province released initial information on the project development agreement they intended to sign for the project. The Pembina Institute asked several questions about how the agreement could restrict future provincial governments from strengthening climate change policy for LNG and shale gas development. Now that the agreement is public, it's possible to start answering those questions:

1. *Would B.C. have to compensate Pacific Northwest LNG if the province decided to improve the Greenhouse Gas Industrial Reporting and Control Act that was implemented last fall? It isn't clear if the compliance costs stemming from the Act would be considered a tax or if those costs would be considered exclusive to LNG.*

The combination of Section 3.5 and Schedule 2 in the agreement appears to prevent the province from strengthening the Greenhouse Gas Industrial Reporting and Control Act without triggering compensation. Compensation could be triggered by changes to any of the main parameters specified in the act, such as:

- Improving the performance standard specified for LNG terminals in the act
- Strengthening the rules governing carbon offsets or limiting the use of offsets
- Increasing the technology fund price above the initial \$25 per tonne price (plus a yet-to-be-determined inflator)

Beyond the regulatory components of the act, the agreement also appears to lock-in the LNG incentive program, which was announced last fall in combination with the act. The program provides a subsidy to LNG projects that have come close to, but failed to meet, the performance standard. For the Pacific Northwest LNG project, this subsidy could amount to \$411 million over the 25-year agreement.<sup>4</sup>

2. *Are there ways that compensation could be triggered if the province relies on economy-wide climate policies like the carbon tax? The government's language implies otherwise because the carbon tax isn't exclusive to LNG. That said, it's important to test if increasing the carbon tax or broadening its coverage could result in a compensation claim.*

According to section 3.4.b of the agreement, the province appears to be preserving their ability to increase or broaden<sup>5</sup> the carbon tax, as long as the application of the policy doesn't single out LNG terminals in some way. Section 3.4.a makes clear that any change to the carbon tax that does single out LNG terminals would be subject to compensation.

3. *Would other approaches to improving environmental performance, such as requiring LNG terminals to use more renewable energy or mandating them to inspect for methane leaks more frequently, trigger compensation?*

The response to this question is more complicated. The scope of the agreement appears to be limited to the LNG terminal. In that case, new regulations or policies could be developed for upstream sources of carbon pollution without triggering compensation. For the terminals, clause 3.5.e.iii could

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<sup>4</sup> Assuming an LNG terminal carbon pollution intensity of 0.22 tonnes CO<sub>2</sub>e per tonne of LNG, 25-year operation of phases 1 and 2 of the project and a compliance cost of \$25 per tonne of CO<sub>2</sub>e. See appendix for details.

<sup>5</sup> The carbon tax applies to almost all fossil fuel combustion in the province. For the natural gas sector, this exempts 35% of the total carbon pollution based on 2013 data from the B.C. Ministry of Environment. The exemptions include sources such as vented and leaked methane.

potentially prevent the province from implementing stronger climate policies that apply exclusively to LNG terminals (e.g. a regulation requiring a specified percentage of their electricity be sourced from renewable sources). It is ambiguous if such a scenario would trigger compensation.

At the same time, clauses 3.5.e.ii and 3.5.e.iii do appear to create some space for future governments to implement stronger climate policies for LNG, as long as those policies apply to more industries than LNG. The example cited in 3.5.e.ii is cap-and-trade. It also appears that new climate policy could be narrower in scope than an economy-wide policy like cap-and-trade, as long as it applies to at least one other industry in similar way. For example, if the province followed through on its long-standing commitment to have a carbon-neutral electricity sector, it could probably extend that requirement to the LNG sector without triggering compensation.

## Acknowledgements

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## Appendix: Settings used in the B.C. Shale Scenario Tool

### LNG demand

- Pacific Northwest LNG phase 1 online in 2020 (12.8 million tonnes of LNG per year)
- Pacific Northwest LNG phase 2 online in 2022 (additional 6.4 million tonnes of LNG per year)

### Non-LNG natural gas demand

- Constant at 2014 levels

### LNG terminal carbon pollution intensity

0.22 tonnes of CO<sub>2e</sub> per tonne of LNG, based on a KPMG report commissioned by Pacific Northwest LNG<sup>6</sup>

### Source of gas

Source of gas	2015	2020	2025	2030	2035	2040	2045	2050
Conventional	35%	30%	20%	15%	15%	15%	15%	15%
Montney	55%	60%	65%	65%	65%	65%	65%	65%
Horn River	10%	10%	15%	20%	20%	20%	20%	20%
Cordova	0%	0%	0%	0%	0%	0%	0%	0%
Liard	0%	0%	0%	0%	0%	0%	0%	0%
Alberta	0%	0%	0%	0%	0%	0%	0%	0%

### Environmental technologies and practices

Settings for scenario with significant improvements in environmental technologies and practices:

Carbon pollution	Active	Year	All/new stock	Carbon reduction
Upstream electrification	On	2020	New	50%
CCS upstream	On	2020	All	50%
Leak repair	On	2020	All	50%
LNG terminal electrification	On	2020	All	50%

Water use	Active	Year	Freshwater reduction
Water recycling	On	2020	25%
Saline water use	On	2020	25%

Wastewater	Active	Year	Wastewater treated
Wastewater treatment	On	2020	25%

<sup>6</sup> KPMG LLP, *Pacific Northwest LNG Limited Partnership Summary: Independent Review of Power Options Evaluation and Selection Process* (2014). [http://pacificnorthwestlng.com/wp-content/uploads/2013/02/PNW\\_Partnership-report\\_v.19\\_WEB.pdf](http://pacificnorthwestlng.com/wp-content/uploads/2013/02/PNW_Partnership-report_v.19_WEB.pdf)