

March 11, 2016

Richard J. Overstall
3783 Broadway Avenue
P.O. Box 847
Smithers, B.C. V0J 2N0

Re: Comments on the CEAA Pacific NorthWest LNG draft environmental assessment report

Dear Mr. Overstall:

This letter details my response to attached retainer letter and I have also attached my CV and a list of relevant publications. In reviewing the draft report on the Pacific NorthWest LNG proposal (the Project) and its associated upstream greenhouse gas (GHG) emissions, I offer the following summary comments:

- I agree that the GHG emissions from the Project and the associated upstream activity are significant and represent material challenges to B.C. and Canada being able to meet their climate change targets. In the case of B.C. in particular, the Project and the associated upstream activity as designed under current policy makes achieving B.C.'s 2050 target an implausible scenario.
- The challenges to B.C. and Canada's efforts to reduce GHG emissions will be exacerbated because of two issues: 1) the international agreement on climate change reached in Paris will require Canada to increase its ambition to reduce GHG emissions over time (and this requirement is embedded within the Vancouver Declaration signed by the Prime Minister and the Premiers on March 3); and 2) the methane emissions from upstream gas included in the draft report likely underestimate the true contribution of methane to the overall emissions from the Project and its associated upstream activities.
- Based on a comparison with other LNG projects proposed for B.C. and evidence on the potential to reduce upstream emissions, it is clear that better practices are possible and already being planned for similar developments in B.C. If the Project and the associated upstream activity followed those better practices for managing GHG emissions, it would reduce, although not resolve, the challenges described in the previous two bullet points.
- The climate change policies currently in place are not adequate to require better practices and put the province and country on track for their climate change commitments. The ongoing freeze in B.C.'s carbon tax and exemptions in carbon tax coverage undermine its ability to encourage cuts in GHG emissions from the Project and upstream activities. Three of the four compliance pathways under B.C.'s Greenhouse Gas Industrial Reporting and Control Act do not ensure GHG emissions reductions from the Project.
- The Project will not help to reduce global GHG emissions, and this argument (advanced by proponents and the province) should not be used to justify the increased GHG emissions in B.C. and Canada. The increased availability of natural gas and LNG does not result in the needed transition away from fossil fuels. The main determinant of that transition will be how effectively national and sub-national jurisdictions adopt climate change policies to reduce the GHG emissions they are responsible for.

These issues are elaborated on in the remainder of the letter as follows:

- Section 1 discusses the federal and B.C. GHG emissions context.
- Section 2 explains that the GHG emissions from the Project and its associated upstream activity are material in both B.C. and federal contexts.

- Section 3 explores how Canada's and B.C.'s efforts to decrease GHG emissions will need to increase over time if the Paris Agreement is going to be successful.
- Section 4 offers some comments on how the transparency of estimation and reporting on upstream GHG emissions could be improved.
- Section 5 explains how the contribution of methane emissions to the GHG emissions from the upstream gas associated with the Project is likely underestimated.
- Section 6 shows how better practices for limiting GHG emissions are possible for the Project and upstream gas development.
- Section 7 explores gaps and inadequacies in B.C.'s current climate policy framework.
- Section 8 explores the issue of downstream GHG emissions and why that would be an inappropriate justification for the Project.

1. Federal and B.C. greenhouse gas emissions context

B.C. has two legislated targets to reduce greenhouse gas emissions: 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050.¹ The 2050 target for B.C. is in line with the level of reductions needed in developed jurisdictions for the world to have a reasonable chance of avoiding two degrees of warming. The federal government also has climate change targets: 17% below 2005 levels by 2020, and 30% below 2005 levels by 2030.

Based on projections from Environment and Climate Change Canada, neither B.C. nor Canada are on track for these targets. Nationally, emissions in 2020 and 2030 are projected to be 3% and 9% higher than 2005 levels rather than 17% and 30% below as targeted.² For B.C., emissions in 2020 and 2030 are projected to be 13% and 30% higher than 2005 levels.

B.C.'s Climate Leadership Team, a cross-sectoral panel of experts, concluded that B.C. will not meet its 2020 target and recommended a new 2030 target of 40% below 2007 levels by 2030. The target was found to be achievable with strong climate policies and capable of getting the province back on track for its 2050 target. The province has yet to announce whether it will be adopting the recommended 2030 target, or the policies needed to achieve it.

Federally, the new government has promised more ambitious action to reduce Canada's greenhouse gas emissions, and is currently working with the provinces to develop a pan-Canadian plan to reduce GHG emissions. In early March, Canada's First Ministers issued the Vancouver Declaration to work together to meet or exceed Canada's international climate targets.³ The details of that plan are not yet available, so it is impossible to know if it will be adequate to get the country on track for the 2030 target. Following the conference, Minister of Environment Catherine McKenna reiterated that Canada would have new climate targets at the end of the federal and provincial consultation process.⁴ The working groups established by the Vancouver Declaration are tasked with delivering policy recommendations to close the emissions gap to the country's existing 2030 commitment.

¹ Government of British Columbia, *Greenhouse Gas Reduction Targets Act* (2008).

<http://www2.gov.bc.ca/gov/content/environment/climate-change/policy-legislation-programs/legislation-regulations>

² Environment and Climate Change Canada, "Canada's Emission Projections in 2020 and 2030" (2016).

<http://ec.gc.ca/ges-ghg/default.asp?lang=En&xml=8BAAFCC5-A4F8-4056-94B1-B2799D9A2EE0>

³ Prime Minister's Office, "Communiqué of Canada's First Ministers" (2016).

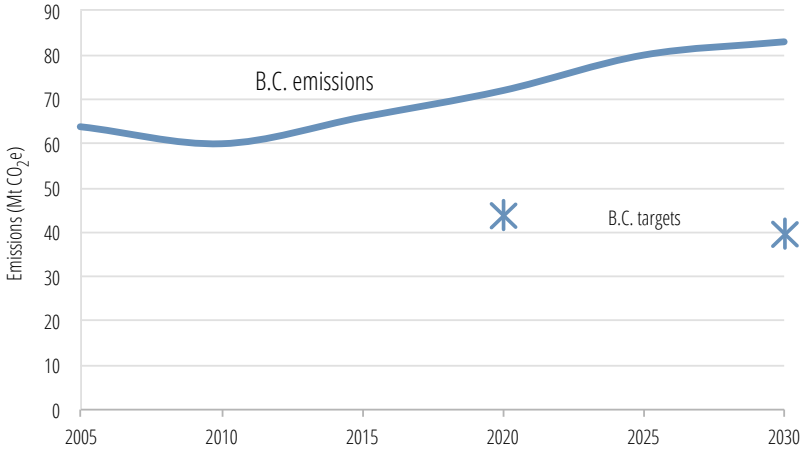
<http://pm.gc.ca/eng/news/2016/03/03/communique-canadas-first-ministers>

⁴ CBC News, "Federal government should cool its jets with new climate targets, Ontario and B.C. premiers say" (2016).

<http://www.cbc.ca/news/politics/federal-government-climate-targets-1.3477171>

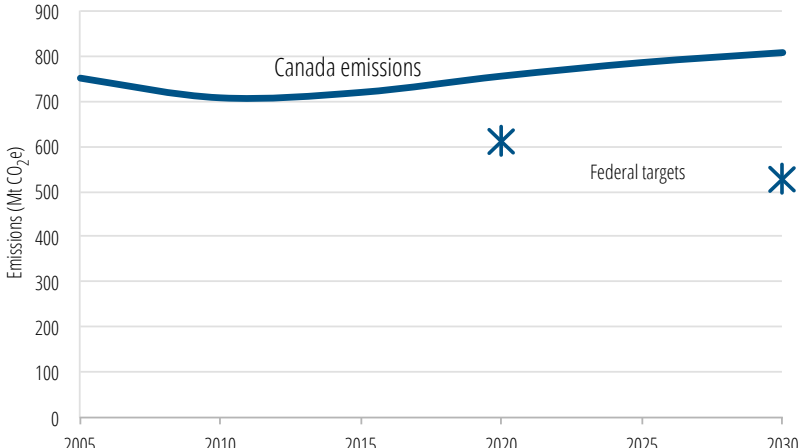
These targets and projections are shown in Figure 1 and Figure 2. In summary, neither B.C. nor Canada is on track for the targets they have set and any new sources of GHG emissions will increase the gaps between projections and targets.

Figure 1: B.C.’s emissions projections and climate targets



B.C.’s 2020 target is legislated. The displayed 2030 target is as recommended by the Climate Leadership Team.

Figure 2: Canada’s emissions projections and climate targets



Canada’s 2020 and 2030 targets are the official targets of the government of Canada.

2. GHG emissions are material in provincial and national contexts

LNG terminal emissions for the Project are estimated in the CEEA Draft Environmental Assessment Report at 5.28 Mt CO₂e^{5,6}, while the proponent states that due to improved engineering, the emissions

⁵ CO₂e refers to carbon dioxide equivalents, which are used to combine carbon dioxide and other greenhouse gas emissions such as methane into equivalent units.

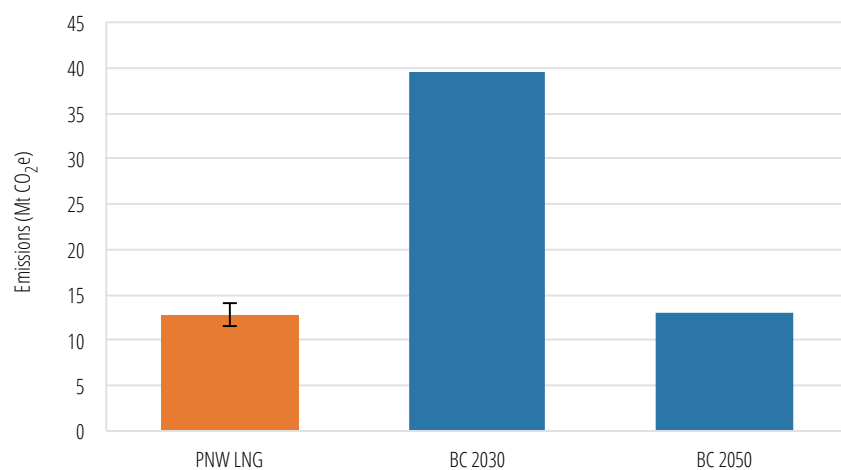
will be 4.9 Mt CO₂e. The proponent projects that the Project will have an operating life of at least 30 years.⁷ Given the anticipated completion date of 2022 for phase 2, the Project would operate past the middle of the century.⁸

Upstream emissions are estimated by Environment and Climate Change Canada (ECCC) using four scenarios from three different models with results ranging from a low of 6.5 Mt to a high of 8.7 Mt.⁹ This gives combined terminal and associated upstream emissions between 11.5 and 14.0 Mt CO₂e.

I use this 11.5 to 14.0 Mt range for the purposes of this section. Section 6 looks at the methane emissions within that total to show why the 11.5 to 14.0 Mt is likely an underestimate. I have not used modified GHG estimates from the Project in this section because doing so would necessitate an update of provincial and national inventories, which also likely underestimate the significance of methane emissions.

In the context of B.C.'s recommended 2030 target, the Project would represent between 29% and 35% of total allowable emissions. In the context of B.C.'s legislated 2050 target, the Project would represent between 88% and 108% of the 2050 allowable GHG emissions. It is unlikely that all of the natural gas needed for the LNG terminal would be produced in B.C., so a portion of the GHG emissions would be counted in Alberta's emissions inventory. If 75% of the gas were produced in B.C. with 25% coming from Alberta, the Project would be responsible for between 9.8 and 11.4 Mt in B.C., which would account for between 75% and 87% of B.C.'s 2050 target.¹⁰ This does not include the GHG emissions from other LNG projects, other upstream natural gas activity, or other sectors of B.C.'s economy. As a result, achieving the 2050 target would be implausible if the Project and its associated upstream activities proceeded as designed under current climate policy. See Figure 3.

Figure 3: PNW LNG terminal and associated upstream emissions compared to B.C.'s climate targets



⁶ Canadian Environmental Assessment Agency, *Pacific NorthWest LNG Draft Environmental Assessment Report* (2016). <http://www.ceaa-acee.gc.ca/050/documents/p80032/104785E.pdf>

⁷ *Pacific NorthWest LNG Draft Environmental Assessment Report*

⁸ CEAA, *Pacific NorthWest Liquefied Natural Gas (LNG) Project Review of Related Upstream Greenhouse Gas (GHG) Emissions Estimates* (2016). <http://www.ceaa.gc.ca/050/documents/p80032/104795E.pdf>

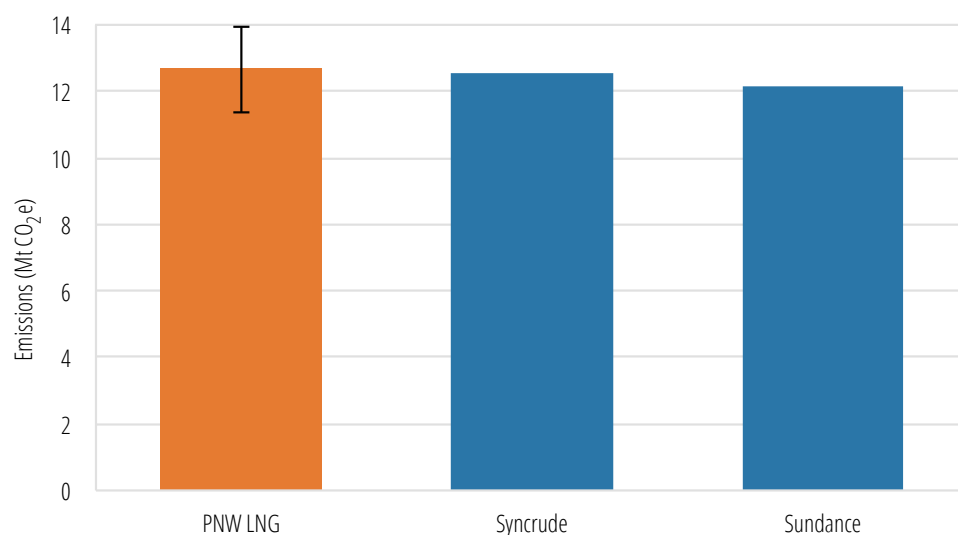
⁹ Based on an average of four tools used by ECCC in assessing upstream emissions associated with the Project.

¹⁰ B.C.'s OGC estimated 75% of LNG supply gas would come from B.C. B.C. Oil and Gas Commission, "Long Term Forecast – Upstream Activities Associated with LNG Development," presentation to Unconventional Gas Technical Forum, Victoria (2014).

Nationally, the 11.4 to 14.0 Mt represents 2.2% to 2.7% of Canada’s 2030 target. While less material than in the context of B.C.’s targets, the 2.2% to 2.7% isn’t negligible. These emissions would exacerbate the challenge already facing the federal government as it seeks to close the gap between projected GHG emissions and the country’s domestic climate targets.

The GHG emissions from the Project would be comparable to the Syncrude mine and upgrader and Sundance coal fired power plant — Canada’s two largest emitters at 12.5 and 12.2 Mt CO₂e respectively.¹¹ As detailed in Section 6, the methane emissions from the Project are likely underestimated, so the Project and its associated upstream emissions could become Canada’s single largest emitter of GHG emissions.¹² Figure 4 shows the relative magnitude of the GHGs from the three projects.

Figure 4: PNW LNG compared to Canada’s two largest GHG emitters



GHG emissions for the Syncrude and Sundance facilities are for the 2013 reporting year. The error bars associated with PNW LNG represent the range of outputs given in the CEEA report and LNG terminal intensity from the proponent, and do not reflect the uncertainty associated with methane emissions.

3. Canada’s ambition will need to increase because of Paris agreement

B.C. and Canada are not on track to achieve their existing targets, and the Project and its associated upstream emissions represents a significant challenge to achieving them. Despite this, Canada’s climate targets and policy agenda must become more ambitious before mid-century to align with the objectives of the Paris Agreement. This reality was embedded into the text of the Vancouver Declaration —

¹¹ ECCC, “Greenhouse Gas Emissions Reporting Program Online Data Search – Facility Reported Data” (2014). <http://www.ec.gc.ca/ges-ghg/donnees-data/index.cfm?do=results&lang=en&year=2013>

¹² The Syncrude upgrader and mine have a similar scope, as upstream and processing activities both occur at the plant. For the Sundance coal plant to have a comparable scope would require including the GHG emissions associated with coal production and transport. Further analysis, including a review of methane emissions from all three projects, would be required to make this comparison fully.

recognizing that Canada requires additional policy measures to secure the deep reductions required by mid-century.¹³

In December 2015, the international community came together in Paris for the 21st United Nations Climate Change Conference. All 195 nations recommitted to keeping temperatures well below a 2 C increase, and to pursue efforts to limit warming to 1.5 C to avoid the worst effects of the climate crisis. Going into the conference, over 100 countries had stated their Intended Nationally Determined Contributions (INDCs). If achieved, these INDCs would limit temperature increases to 2.7 C, significantly above the upper limit 2 C goal.¹⁴ To limit warming to 1.5 C, or even to 2 C, will require an increased level of ambition globally.

Canada is no exception to the need for increased ambition. Canada's INDC of a 30% reduction was seen as one of the weaker ones for developed countries.¹⁵ It is generally agreed that limiting the temperature increase to 2 C requires emission reductions of 50% by the middle of the century, with the developed world having to reduce emissions by approximately 80%.¹⁶ Canada's 2020 and 2030 targets do not currently align with this trajectory.

The Paris Agreement acknowledges this gap between current GHG reduction targets and the global temperature objectives. To help close the gap, the agreement includes a mechanism to increase ambition over time. This mechanism works by countries updating their INDCs every five years, with each submission being more ambitious than the last. These new submissions will be reviewed to assess their overall impact and benchmarked against the long-term goals set (i.e. limiting temperature increases to well below 2 C and aiming for 1.5 C). If the review concludes that the collective effort is not enough to achieve these goals, countries are required to increase their ambition further by submitting new or updated INDCs.

At least two examples demonstrate how this thinking is gaining traction in Canada. First, Canada's Minister of the Environment and Climate Change has described the country's 2030 targets as the floor for Canada's ambitions.¹⁷ Second, the first section of the Vancouver Declaration from the First Ministers' meeting on climate change is about increasing the level of ambition.¹⁸ The First Ministers specifically commit to implementing GHG mitigation policies in support of meeting or exceeding Canada's 2030 target, and increasing the level of ambition of environmental policies over time in order to drive greater GHG emissions reductions, consistent with the Paris Agreement.

The Project presents an obstacle for these efforts to increase ambition because it has a long lifespan during which it is very difficult to reduce GHGs significantly. The Project Development Agreement that B.C. signed with the proponent presents a second obstacle. That agreement limits the government's ability to strengthen climate change policy applying to the LNG terminal.¹⁹ For example, if a future government wanted to require an improvement in the GHG intensity of the terminal, they would likely be required to pay compensation to the operator.

¹³ Canadian Intergovernmental Conference Secretariat, *Vancouver Declaration on Clean Growth and Climate Change* (2016). <http://www.scics.gc.ca/english/Conferences.asp?a=viewdocument&id=2401>

¹⁴ Climate Action Tracker, "INDCs lower projected warming to 2.7 C: significant progress but still above 2 C." http://climateactiontracker.org/assets/publications/CAT_global_temperature_update_October_2015.pdf

¹⁵ Climate Action Tracker, "Tracking INDCs." <http://climateactiontracker.org/indcs.html>

¹⁶ Rogelj et al., "Emission pathways consistent with a 2 C global temperature limit," *Nature Climate Change*, 1, no. 8 (2011). DOI: 10.1038/nclimate1258

¹⁷ The Canadian Press, "Catherine McKenna says Canada won't set emissions target, Tory targets will be 'floor'" (2015). <http://www.cbc.ca/news/politics/catherine-mckenna-paris-talks-tory-target-1.3311482>

¹⁸ Communiqué of Canada's First Ministers.

¹⁹ Pembina Institute, "Petronas agreement would limit B.C.'s options" (2015). <http://www.pembina.org/blog/petronas-agreement-would-limit-bcs-options>

The agreement doesn't eliminate all of the options to improve the climate change policies effective on LNG producers, but it significantly limits them, thereby limiting options through which B.C. and Canada can live up to the commitments in the Paris Agreement and the Vancouver Declaration.

4. Transparency in modelling assumptions

I support the inclusion of upstream GHG emissions in the report, because this begins to fill an important gap in existing environmental assessment practices. A challenge with the information currently included is the lack of transparency around the input assumptions (e.g. origin of gas supply and environmental policies in place). Additionally, the CEAA analysis mentions that the Pembina Institute's B.C. Shale Scenario Tool does not account for differing emissions from production or processing facilities. Although the outputs are not separated into these groupings by default, the Pembina tool is able to disaggregate emissions from production, transmission and processing for each producing basin. I am happy to offer guidance to CEAA staff in using the tool to its fullest potential in assessing the GHG impacts from LNG development.

5. Underestimated methane emissions

Methane emissions from upstream natural gas activities are an important factor in assessing the overall emissions associated with the Project for two reasons: methane is a very potent greenhouse gas relative to carbon dioxide, and there is a significant amount of uncertainty regarding the actual volume of methane leaked and vented from the natural gas supply chain. While the draft assessment report includes methane emissions within the upstream emissions, I think there is a high likelihood that those emissions are underestimated — potentially by a significant amount.

To explore this, I will rely on the Pembina B.C. shale tool, which is one of three sources used to estimate upstream emissions in the draft report.²⁰ The Pembina tool uses emission factors from Clearstone Engineering (2014), which give a methane emissions rate of 0.20%. This rate is similar to the B.C. Provincial Inventory report (0.27%)²¹ and the B.C. Industrial Facility Greenhouse Gas Emissions Report (0.24%).²² I was unable to compare this to the methane emission rates from the other two sources of upstream emissions in the draft report because methane couldn't be isolated based on the information made available by CEAA.

The methane emission rates cited above are based on factors as opposed to measurements, and there is a lack of analysis to verify the accuracy of those estimates. The methane emissions rate reported by the U.S. Environmental Protection Agency across a comparable part of the supply chain (the production, processing, and transmission stages) is 1.33%, or more than five times greater than what is currently reported in B.C.^{23,24} The 1.33% is primarily based on factors as well and there is evidence it is an

²⁰ *Pacific Northwest Liquefied Natural Gas (LNG) Project Review of Related Upstream Greenhouse Gas (GHG) Emissions Estimates.*

²¹ B.C. Ministry of Environment, *British Columbia Greenhouse Gas Inventory Report (2012)*: <http://www2.gov.bc.ca/assets/gov/environment/climate-change/reports-and-data/provincial-ghg-inventory-report-bcs-pir/pir-2012-full-report.pdf>

²² B.C. Ministry of Environment, "GHG Facility Reports - Questions & Answers" (2013).

<http://www2.gov.bc.ca/gov/content/environment/climate-change/reports-data/industrial-facility-ghgs/qs-and-as>

²³ Statistic Berkley. <http://static.berkeleyearth.org/memos/epa-report-reveals-lower-methane-leakage-from-natural-gas.pdf>

²⁴ EPA, "Considering CH₄ emissions only from Field Production, Processing and Transmission and Distribution – Table 3-44," *US Greenhouse Gas Inventory 2013: Chapter 3 — Energy.*

<http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Chapter-3-Energy.pdf>

underestimate for the U.S., as Brandt et al. found that that emissions inventories consistently underestimate methane emissions from natural gas production.²⁵ Recognizing the actual methane emissions rate could be higher or lower, I will use the 1.33% to explore the implications of it being substantially higher than currently reported.

In addition to the potential for a higher methane emissions rate, recent research by the Intergovernmental Panel on Climate Change (IPCC) suggests the global warming potential assigned to methane is higher than the standard factors in use today. The default global warming potential set in the Pembina tool was 21, which reflected B.C.'s GHG reporting requirements when the tool was developed. Since then, B.C. and Canada have updated the value to 25 to reflect current IPCC guidelines, starting with the 2013 reporting year.²⁶ The most recent Assessment Report by the IPCC (AR5) suggests that this value should be 34 over a 100-year time frame and when including climate-carbon feedbacks.²⁷

To quantify the potentially higher methane emissions rates and the higher global warming potential, I used the Pembina Shale tool and changed the methane leakage rate to the level reported by the EPA (1.33%) and the methane GWP to the most current IPCC findings (34). Under these assumptions, upstream methane emissions associated with the Project increase from 0.8 Mt CO₂e to 10.6 Mt CO₂.²⁸ Total emissions from the Project and associated upstream activities would increase from 11.5 to 21.3.²⁹

6. Better practices are possible

Adding to the concern that the GHG emissions from the Project and associated upstream activities are significant is evidence that there are opportunities to rely on better practices to reduce emissions from the terminal and upstream activities. As a result, the GHG emissions from the Project and associated upstream activities are higher than they need to be.

Focusing on the terminal, two other LNG projects proposed for B.C. would have significantly lower GHG emissions under the same policy conditions:

- The LNG Canada project is proposing to use high efficiency gas turbines and renewable electricity for auxiliary power at the LNG terminal, and aims to achieve an emission intensity of 0.15 t-CO₂e/t-LNG, or 41% better than the Project.³⁰ This project is of similar scale to the Project and located in nearby Kitimat.

²⁵ Brandt et al., "Methane leaks from North American natural gas systems," *Science*, 343 (2014). DOI: 10.1126/science.1247045

²⁶ ECCC, "Technical Guidance on Reporting Greenhouse Gas Emissions." <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=47B640C5-1&printfullpage=true>

²⁷ IPCC, *Working Group 1 Contribution to the IPCC Fifth Assessment Report: Climate Change 2013: The Physical Science Basis*. https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/drafts/fgd/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter08.pdf

²⁸ Calculated using the Pembina B.C. Shale Scenario Tool: default settings, leakage rate of 1.33%, GWP of 34, a GHG intensity for the terminal of 0.255 t-CO₂e/t-LNG, current environmental practices. Calculated for the year 2030.

²⁹ The numbers are based on calculations from the Pembina Shale Scenario Tool and include the Project and associated upstream emissions. Note: the 11.5 Mt CO₂e is slightly higher than indicated in the Pembina backgrounder *Pacific Northwest LNG Implication* (July, 2015). I have updated the LNG terminal intensity from 0.22 t-CO₂e/t-LNG to 0.255 t-CO₂e/t-LNG based on a recent submission from the proponent, and adjusted the GWP for methane from 21 to 34 to reflect the latest findings from the IPCC, which was an error in the July 2015 paper.

³⁰ CEAA, *LNG Canada Export Terminal Project Assessment Report*. <https://www.ceaa-acee.gc.ca/050/documents/p80038/101852E.pdf>

- The Woodfibre LNG project, a smaller project proposed for Howe Sound, proposing to use electric motors for the liquefaction and dry seals for compressors. It is aiming to achieve an emission intensity of 0.054 t-CO₂/t-LNG³¹, or 79% less than the Project.

Looking at the upstream, ample opportunities exist to reduce emissions as well, although stronger policy and/or higher natural gas prices would be required to take advantage of those opportunities. For example, research by the consulting firm ICF International recently found that methane emissions from Canada's oil and gas sector could be reduced by 45% for less than \$3 per tonne CO₂e.³² The B.C. Climate Leadership Team report discussed opportunities to reduce emissions from upstream gas through better methane management, electrification and carbon capture and storage.

7. Climate policies for LNG and natural gas are inadequate

I agree with the draft report's conclusion that existing climate policy in B.C. will not be effective in mitigating the GHG emissions from the Project. In this section I offer further detail on specific weaknesses in the existing policy framework and point to the work of B.C.'s Climate Leadership Team as a set of recommendations that would address those weaknesses.

The climate policies currently in place in B.C. and relevant for the Project and its associated upstream activities are the carbon tax and the Greenhouse Gas Industrial Reporting and Control Act (GHGIRCA). For the purposes of the Project and its associated upstream activities, the carbon tax applies to the combustion of fossil fuels at the LNG terminal and in upstream activities (including flaring). Excluded from coverage are methane emissions and vented formation CO₂ (carbon dioxide entrained in raw natural gas that is removed and vented at gas processing plants).

While the carbon tax has been widely praised as well designed climate policy, it is inadequate in two key ways with regards to the Project and the associated upstream activities.

- The exemptions for methane and formation CO₂ mean that there is no incentive to reduce those sources of GHG emissions. The Climate Leadership Team recommended eliminating those exemptions in 2021.
- The rate has been frozen at \$30 per tonne of CO₂e since 2013, which means it is becoming a less effective policy over time due to inflation. The Climate Leadership Team recommended restarting annual increases in July 2018 of \$10 per tonne per year for five years. While not part of the recommendations, the Team's report acknowledged that the carbon tax would need to continue increasing at this rate until mid-century.

To date, the province has not accepted the recommendations to expand carbon tax coverage or increase the rate, so both inadequacies still exist.

The GHGIRCA works in addition to the carbon tax and sets an emissions intensity target of 0.16 tonnes of CO₂e per tonne of LNG produced. If an LNG terminal's emissions intensity is less than or equal to the 0.16 requirement, then they are only required to pay the carbon tax. If the terminal has a higher emission intensity, proponents can comply with the act by purchasing offsets, paying into a technology fund at a rate of \$25/t-CO₂, or purchasing emission credits from other LNG projects with emissions intensities

³¹ CEAA, *Woodfibre LNG Project – Review of Related Upstream GHG Emissions Estimates*. <http://www.ceaa-acee.gc.ca/050/documents/p80060/104688E.pdf>

³² Pembina Institute, *Economic Analysis of Methane Emissions Reduction Opportunities in the Canadian Oil and Natural Gas Industries* (2015). <https://www.pembina.org/reports/edf-icf-methane-opportunities.pdf>

below the benchmark.³³ With an emission intensity of 0.255 t-CO₂/t-LNG, the Project would be well above the benchmark and would need to utilize one of these compliance pathways as a result.

The problem is that all three compliance pathways offer no guarantee that GHG emissions will be reduced:

- While offsets can represent real GHG reductions, there are many examples where the offsets don't represent real reductions, or are only partially additional to what would have happened without the offset. For B.C. offsets, the Auditor General reviewed the first two major projects used to meet the province's carbon neutral commitment and found the offsets were not additional and did not result in verifiable emission reductions.³⁴
- Paying into a technology fund for each tonne of CO₂ above the benchmark can result in good investments, but those investments are not linked directly to GHG emissions reductions.
- Purchasing emission credits from other LNG projects that outperform the benchmark is only a compliance option if other LNG projects go ahead in B.C. This means that this compliance option would only be available to the Project because overall GHG emissions are increasing because of other projects.

The Climate Leadership Team did not offer any recommendations to improve the GHGIRCA, instead focusing on the aforementioned improvements to the carbon tax. The Team did offer several complementary recommendations to support the incentive provided by the carbon tax. These included an electrification strategy for LNG and natural gas, and regulations to reduce methane emissions — an important gap given B.C. is the only jurisdiction in the top 10 gas producing states and provinces that does not have comprehensive state/provincial and/or federal methane regulations in place.³⁵ At Globe 2016, Premier Clark announced an intention to address this gap by aligning B.C.'s efforts with Alberta's. On March 10, Prime Minister Trudeau and President Obama jointly announced plans to cut methane emissions from the oil and gas sector by 40 to 45% by 2025.³⁶ Details on the policies to reduce methane are not available in Alberta, B.C. or federally, so I'm not in a position to assess the potential effectiveness at this point.

If implemented, the Climate Leadership Team recommendations would give me confidence that GHGs from LNG and the gas sector would be significantly reduced. Without those recommendations being adopted, the economic incentives and regulatory requirements are inadequate to provide that confidence.

8. B.C. LNG exports do not help reduce end-use GHG emissions

While the draft report states that downstream GHG emissions are out of scope, I have chosen to comment on the issue because they may be offered as an argument for justifying the Project. The B.C. government and LNG proponents often state that exporting LNG will help reduce global emissions by displacing higher carbon fuels, notably coal.^{37,38}

³³ B.C. Legislative Assembly, *Greenhouse Gas Industrial Reporting and Control Act* (2014).

https://www.leg.bc.ca/pages/bclass-legacy.aspx#/content/legacy/web/40th3rd/3rd_read/gov02-3.htm

³⁴ Auditor General of B.C., *An Audit of Carbon Neutral Government*.

https://www.bcauditor.com/sites/default/files/publications/2013/report_14/report/OAG%20Carbon%20Neutral.pdf

³⁵ Pembina Institute, "Managing methane emissions from B.C.'s gas sector" (2016).

<http://www.pembina.org/blog/webinar-managing-methane-emissions-from-bcs-gas-sector>

³⁶ Prime Minister of Canada, "U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership" (2016).

<http://www.pm.gc.ca/eng/news/2016/03/10/us-canada-joint-statement-climate-energy-and-arctic-leadership>

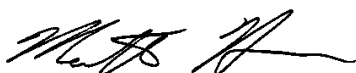
³⁷ B.C. Government. Speech From the Throne (2016). Retrieved from: <http://engage.gov.bc.ca/thronespeech/transcript/>

While there is ongoing uncertainty about the true magnitude of methane emissions from the oil and gas sector, the balance of evidence currently indicates that LNG from North America is on average less GHG emissions-intensive than coal for generating electricity, as long as effective policies to limit methane emissions are in place.³⁹ I also think that such arguments convey a misplaced confidence that B.C.-supplied LNG will replace coal. LNG from B.C. (or any exporter) also competes with other sources of natural gas, efforts to improve energy efficiency, and new supplies of renewable energy. The increased availability of LNG can just as easily delay a wind energy investment as it can accelerate a coal-fired power shutdown.

Analysis done by the Pembina Institute for the Pacific Institute for Climate Solutions (PICS) finds that LNG from B.C. is not a global climate solution.⁴⁰ While global demand for natural gas persists in a world that limits warming to 2 degrees, that demand is lower than in a business as usual scenario, it peaks near 2030, and declines below current levels by mid-century. The primary determinant of global GHG reductions in Asia is climate policy in Asia. If strong climate policy is in place, the use of natural gas would fit within a broader energy mix that is conducive of limiting warming to 2 degrees. Given the world is currently on track for 2.7 degrees of warming (if all current commitments are met), adequate climate change policies are clearly not in place.

A recent study by five teams using state of the art integrated assessment models came to a similar conclusion. They showed that increased use of natural gas is not a substitute for climate change mitigation policy: “market-driven increases in global supplies of unconventional natural gas do not discernibly reduce the trajectory of greenhouse gas emissions or climate forcing.”⁴¹ Similarly, Davis and Shearer (2014) wrote: “...without new climate policies, abundant supplies of natural gas will have little impact on greenhouse gas emissions and climate change.”⁴²

Sincerely,



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³⁸ Letter from Pacific NorthWest LNG to the Canadian Environmental Assessment Agency (Dated: February 25, 2016). Retrieved from: <http://www.ceaa-acee.gc.ca/050/documents/p80032/105746E.pdf>

³⁹ National Energy Technology Laboratory, *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States* (U.S. Department of Energy, 2014).

⁴⁰ Horne and MacNab, *Liquefied Natural Gas and Climate Change: The Global Context* (Pembina Institute, 2014). <http://www.pembina.org/pub/lng-and-climate-change-the-global-context>.

⁴¹ McJeon et al., “Limited impact on decadal-scale climate change from increased use of natural gas” *Nature*, 514 (2014). <http://www.nature.com/nature/journal/v514/n7523/full/nature13837.html>

⁴² Davis and Shearer, “Climate change: A crack in the natural-gas bridge,” *Nature*, 514 (2014). DOI: 10.1038/nature13927