Submission on the Cedar LNG Project on behalf of Douglas Channel Watch

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Abstract

In its recent "Canada's Energy Future 2021" report, the Canada Energy Regulator (CER) envisaged up to 37 megatonnes of annual LNG exports from Canada's west coast supplied largely by gas produced in northeast B.C. Potential LNG export projects include Phase 1 of LNG Canada, now under construction in Kitimat, and other proposals including Cedar LNG in the Kitimat area and Phase 2 of the LNG Canada project. These LNG export projects, if built, would emit large volumes of greenhouse gas from the production of feed gas, pipeline transport, liquefaction, tanker transport, regasification and final combustion.

These proposals come at a time when both B.C. and Canada have committed to aggressive reductions in greenhouse gas emissions. In late 2021, B.C. announced its "CleanBC Roadmap to 2030", in which it reasserted its commitment to a 40% reduction in emissions by 2030 and net-zero emissions by 2050. In late March, 2022, Canada released its "2030 Emissions Reduction Plan" which committed to a 40-45% reduction in emissions by 2030 and net-zero by 2050, as well as an overall 42% reduction in oil and gas sector emissions from 2019 levels by 2030. Both the B.C. and Canada plans committed to a reduction in methane emissions of 75% by 2030.

Oil and gas production accounted for 20% of B.C.'s and 26% of Canada's emissions in 2019, the most recent year for which data is available. These percentages are likely higher as methane, a greenhouse gas 28 times as potent as carbon dioxide over 100 years, is known to be underestimated in Canada's official emissions inventory. In order to provide gas for LNG exports, CER forecast that a 50% increase in B.C. gas production would be needed, combined with a reduction in domestic consumption.

Even assuming methane emissions are not underestimated and the emissions reduction from oil and gas production in the B.C. and Canada plans is achieved, emissions from gas production and transport without LNG exports would be 4 megatonnes per year in 2050, which would have to be removed with costly technologies such as carbon capture and storage to achieve B.C.'s net zero target. Phase 1 of the LNG Canada project, currently under construction, would add 5 megatonnes to 2050 emissions, more than doubling emissions from domestic consumption alone. The addition of Cedar LNG and Phase 2 of LNG Canada would add another 6 megatonnes, and if all 37 megatonnes of export capacity were built, 2050 emissions would be more than 18 megatonnes, or nearly 30% of B.C.'s present total. And this is a best-case scenario, given that methane emissions are known to be underestimated and the promised emissions cuts may not be realized (despite earlier commitments to reduce emissions, B.C.'s emissions were up 4.2% from 2007 levels in 2019).

There is clearly no scope for allowing any of these LNG projects to go ahead if B.C. and Canada are serious about meeting their net-zero commitments by 2050. These projects present an insurmountable emissions problem even if every other sector of B.C.'s economy could be reduced to net-zero by 2050, which in itself would be an extremely difficult challenge.

Preamble

Cedar LNG is a proposal to export three megatonnes of LNG per year from a location near Kitimat utilizing gas produced in northeast B.C. and transported to the site by the Coastal Gas Link pipeline now under construction. This would add to planned LNG exports of 14 million tonnes per year from the LNG Canada terminal now under construction in Kitimat.

Both the Cedar LNG and Kitimat LNG projects would add significantly to B.C.'s greenhouse gas emissions at a time when B.C. has committed to a 40% reduction from 2007 levels by 2030 and net-zero by 2050 under its "CleanBC Plan"[1] (hereinafter termed "B.C. Plan"). Canada has also committed to a 40-45% reduction from 2005 levels by 2030 and net-zero by 2050 in its "2030 Emissions Reduction Plan"[2] (hereinafter termed "Canada Plan"). Despite these and earlier commitments to reduce emissions, B.C.'s emissions were up 4.5% from 2007 levels in 2019[3], the most recent year of reporting, and Canada's emission were down just 1.2% from 2005 levels[4]. As of 2019, Canada's emissions were up 3.4% from 2016 when it signed the Paris Agreement committing to aggressive emissions reductions.

Despite this dismal performance, the signed agreements, and the fact that the oil and gas sector accounted for 26% of Canada's emissions and 20% of B.C.'s emissions in 2019, both B.C. and Canada are acting to expand the industry. Canada is constructing the Trans Mountain pipeline expansion project[5] to increase oil exports from the west coast and recently approved the Bay du Nord project on the east coast[6]. B.C. has approved the LNG Canada terminal and associated Coastal Gas Link pipeline, along with the increased gas production that must come with LNG exports.

It is in this context that the impact from the added gas production and emissions for the Cedar LNG project must be evaluated.

Emissions

Notwithstanding the environmental impacts surrounding the construction and operation of the Cedar LNG terminal itself, which are dealt with in the Cedar LNG Environmental Assessment Certificate Application[7] (hereinafter termed "Cedar Application"), this submission deals with the

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[1] Clean B.C. Roadmap to 2030, October, 2021, https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf .
[2] 2030 Emissions Reduction Plan, March, 2022, https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/erp/Canada-2030-Emissions-Reduction-Plan-eng.pdf .
[3] B.C. Provincial Gas Emissions Inventory, 2021, https://www2.gov.bc.ca/assets/gov/environment/climate-change/data/provincial-inventory/2019/bc_provincial_ghg_inventory_1990-2019.xlsx .
[4] National inventory report: greenhouse gas sources and sinks in Canada, https://publications.gc.ca/site/eng/9.506002/publication.html .
[5] Trans Mountain Expansion Project, https://www.canada.ca/en/campaign/trans-mountain.html
[6] Canada approves $12 bln Bay du Nord offshore oil project, https://www.reuters.com/business/energy/canada-approve-bay-du-nord-oil-project-wednesday-ctv-2022-04-06/ .
[7] Cedar LNG Environmental Assessment Certificate Application, 2022, https://www.projects.eao.gov.bc.ca/p/5d64644c2f3e4f00223e81c0/application?pageSize=63&currentPage=1 .

upstream and downstream greenhouse gas emissions of the project in the context of the B.C. and Canada emissions reduction commitments.

Emissions from LNG projects include those from the upstream production and pipeline transfer of natural gas to the liquefaction terminal, emissions from the liquefaction process, emissions from boil-off during tanker loading, unloading and transport, emissions from regasification at the delivery point, and emissions from final combustion. The life-cycle emissions of LNG have been analyzed by the U.S. National Energy Technology Laboratory (NETL 2014[8], 2019[9]), Carnegie-Mellon and others, the results of which have been summarized by the Natural Resources Defense Council (NRDC, 2020[10]).

Emissions from the extraction, pipeline transport and liquefaction of natural gas will remain in B.C. and hence must be counted against the emissions reduction targets of B.C. and Canada. Emissions from downstream tanker transport, regasification and combustion will not be counted against the B.C. and Canada emissions reduction targets but will impact the global warming problem.

Emissions within B.C. (Upstream and Liquefaction Emissions)

The latest gas production forecasts for B.C were released by the Canada Energy Regulator (CER) in December, 2021[11]. The most conservative CER production forecast, termed the "Evolving Policies Scenario", assumes that new policies will be enacted to advance climate goals and included the approved LNG Canada project (phases 1 and 2) as well as additional production for an unspecified LNG project (which could include Cedar LNG and/or a project such as the Nisga'a Lisims's proposal north of Prince Rupert[12]). The CER production forecast for B.C. is illustrated in Figure 1. Domestic consumption in this figure includes consumption within B.C. as well as gas shipped by pipeline to the U.S. and other provinces, and is forecast to decline through 2050 (even though domestic gas consumption has risen continuously over the past two decades).

[8] Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, U.S. National Energy Technology Laboratory, DOE/NETL-2014/1649, Life Cycle GHG Perspective Report.pdf (energy.gov) .

[9] Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States: 2019 UPDATE, September, 2019, DOE/NETL-2019/2041, 2019 NETL LCA-GHG Report.pdf (energy.gov) .

[10] Natural Resources Defense Council, 2020, SAILING TO NOWHERE: Liquefied natural gas is not an effective climate strategy, https://www.nrdc.org/sites/default/files/sailing-nowhere-liquefied-natural-gas-report.pdf .

[11] Canada Energy Regulator, December, 2021, Canada's Energy Future 2021, Canada's Energy Future 2021 (cer-rec.gc.ca) .

[12] Terrace Standard, Coastal LNG project offers much potential, says Nisga'a Lisims president, https://www.terracestandard.com/news/coastal-lng-project-offers-much-potential-says-nisgaa-lisims-president/#:~:text=With%20an%20estimated%20%2455%20billion,Lisims%20Government%20president%20Eva%20Clayton .

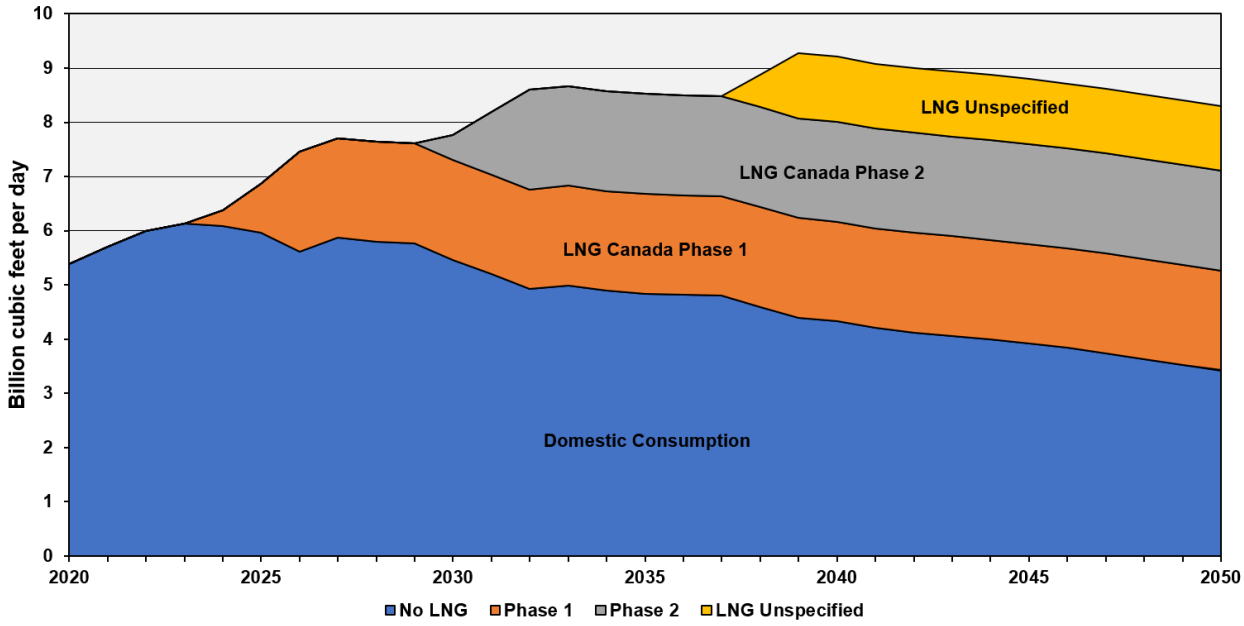

Figure 1 – CER Evolving Policies Scenario natural gas production forecast for B.C. through 2050 (see text).

Natural gas required by an LNG terminal includes the gas to be liquified and the gas needed to power the liquefaction process. The gas required for liquefaction in the case of Cedar LNG would be about 3% of the gas volume to be liquefied (given that Cedar LNG would primarily use electricity from the grid for liquefaction). In the case of LNG Canada, gas required to power the liquefaction process would be about 6% of the volume of gas to be liquefied (LNG Canada as described by the B.C. Environmental Assessment Office will emit 0.16 tonnes of emissions per tonne of LNG produced[13], whereas Cedar LNG will emit 0.8 tonnes per tonne of LNG produced[14]).

Figure 2 illustrates the CER Evolving Policies Scenario forecast of B.C. gas production including Cedar LNG assuming it starts up in 2030 along with Phase 2 of the LNG Canada project. This figure includes the gas needed for liquefaction with each LNG terminal. The inclusion of Cedar LNG and the gas required for liquefaction reduces the amount of gas available for domestic consumption compared to Figure 1 (unless gas production were to be increased above the CER production forecast).

[13] B.C. Environmental Assessment Office, LNG Canada Export Terminal Project, May, 2015, see Page 60, https://www.ceaa-acee.gc.ca/050/documents/p80038/101852E.pdf .

[14] Cedar LNG Environmental Certificate Application, Cedar LNG Project Environmental Assessment Certificate Application - Frontmatter (gov.bc.ca) .

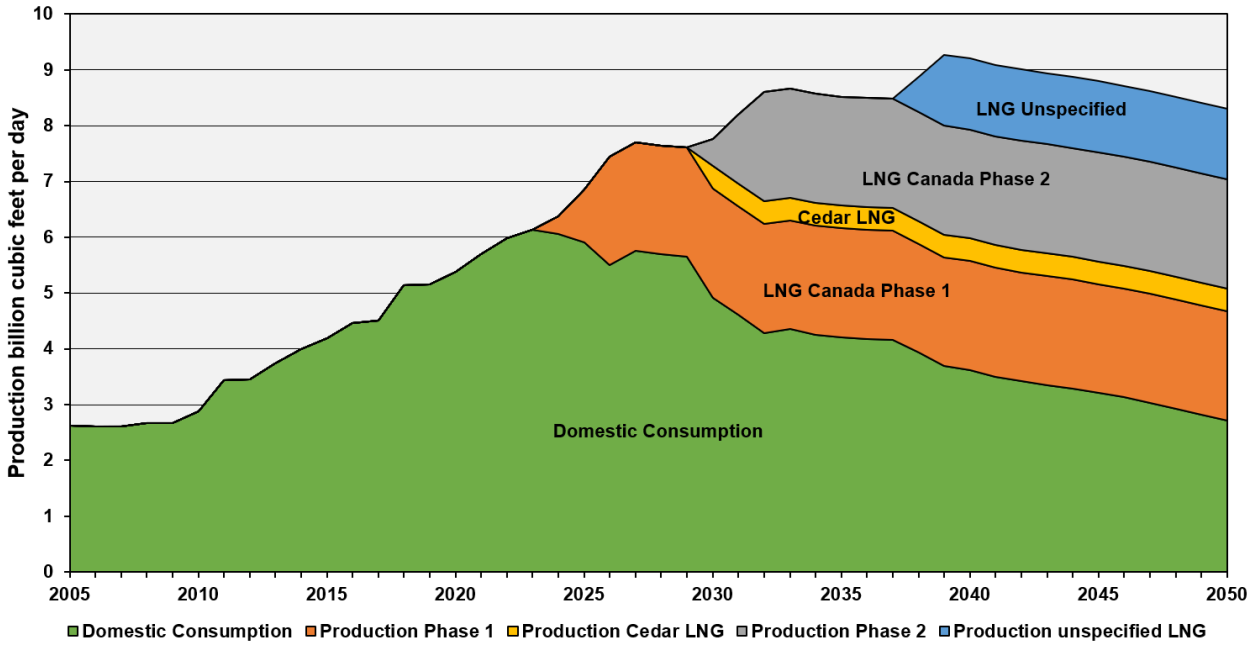

Figure 2 – CER Evolving Policies Scenario natural gas production forecast for B.C. through 2050 assuming Cedar LNG starts in 2030 and including the gas needed to power the liquefaction process with the Cedar LNG and LNG Canada projects (see text).

The B.C. and Canada emissions reduction plans contain aggressive reduction targets for oil and gas sector emissions by 2030 (B.C. has an equivalency agreement with Canada on methane such that provincial targets are considered equivalent to Canada targets[15]). These include:

- Forty to forty-five percent reduction in methane emissions from 2012 levels by 2025 and 75% by 2030 (B.C. and Canada Plans).
- Reduction in overall emissions from the oil and gas sector by 42% from 2019 levels by 2030 (Canada Plan).

B.C.'s emissions by economic sector and greenhouse gas are provided by Canada's National Inventory Report (NIR) through 2019[16]. The NIR also includes an annual breakdown of carbon dioxide, methane and nitrous oxide emitted by the oil and gas sector from 1990 to 2019. Figure 3 illustrates the emissions of carbon dioxide, methane and nitrous oxide per unit of gas production (emissions intensity) based on 2005 to 2019 production data from CER and emissions data from the NIR, with a projection to 2030 assuming a 75% reduction in methane and nitrous oxide from 2012 to 2030 and a 42% reduction in overall oil and gas sector emissions from 2019 to 2030 per the above targets. (Nitrous oxide is produced in small quantities compared to carbon dioxide and methane but it is a much more powerful greenhouse gas, and although nitrous oxide was not

[15] Agreement on the equivalency of Federal and British Columbia regulations respecting the release of methane from the oil and gas sector in British Columbia, 2020, file:///C:/Users/daveh/Downloads/Canada-BritishColumbiaEquivalencyAgreementMethane2020-eng.pdf .

[16] B.C. Provincial Gas Emissions Inventory, 2021, https://www2.gov.bc.ca/assets/gov/environment/climate-change/data/provincial-inventory/2019/bc_provincial_ghg_inventory_1990-2019.xlsx .

mentioned in the B.C. and Canada plans it is assumed in Figure 3 that it will parallel the 75% reduction of methane by 2030).

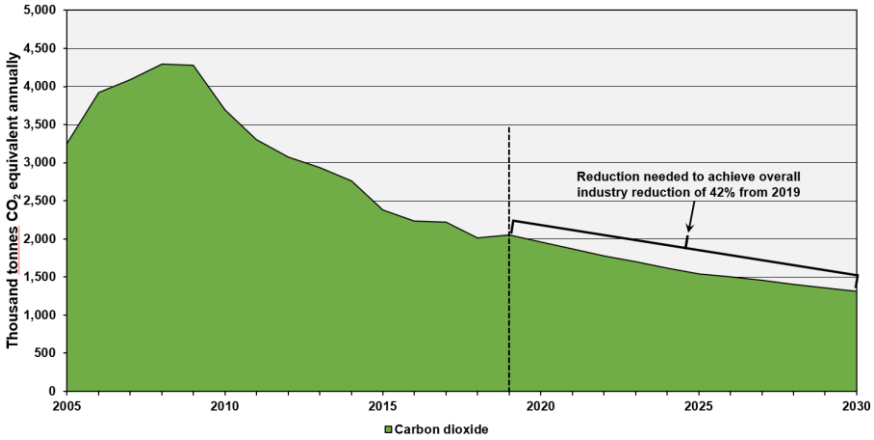

Figure 3a – Annual carbon dioxide emissions from one billion cubic feet of gas production per day (see text).

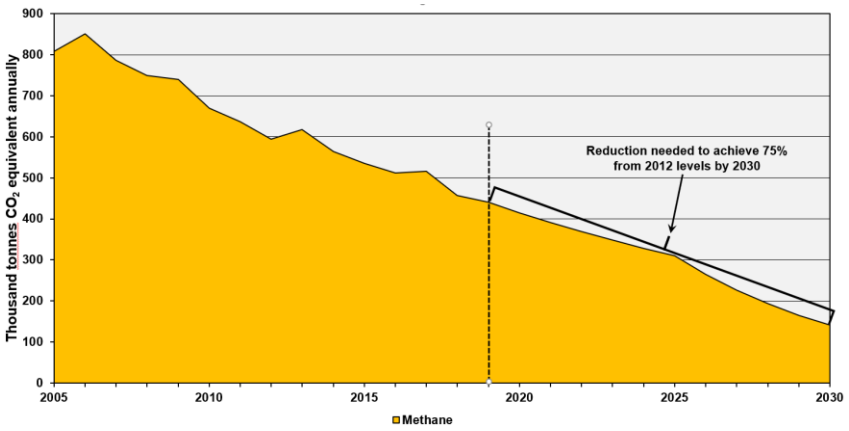

Figure 3b – Annual carbon dioxide equivalent emissions of methane from one billion cubic feet of gas production per day (see text). A 100-year global warming potential is assumed.

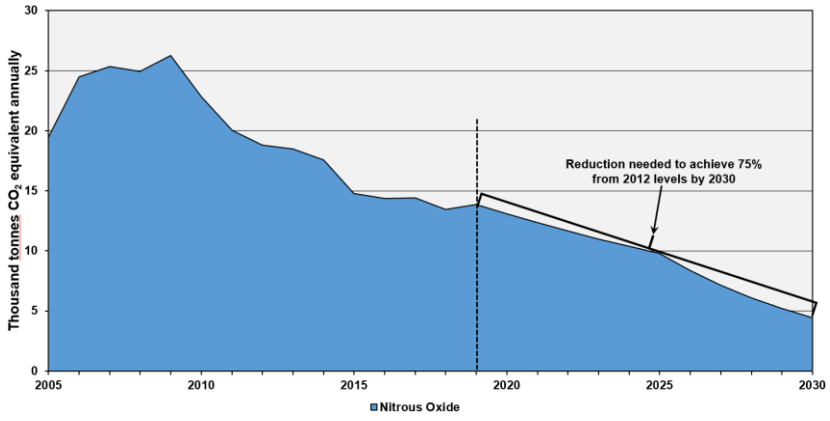

Figure 3c – Annual carbon dioxide equivalent emissions of nitrous oxide from one billion cubic feet of gas production per day (see text). A 100-year global warming potential is assumed.

Although the proportional decrease in emissions intensity shown in Figure 3 to meet the targets in the 2022 Canada Plan is correct, there is evidence that the volume of methane emissions in Canada's NIR has been vastly underestimated. This is very important as methane has a global warming potential (GWP) of 28 times that of carbon dioxide over 100 years and 84 times that of carbon dioxide over 20 years. The emissions rate of methane reported in Canada's NIR is 0.3%, whereas the emissions rate in other studies ranges much higher. Alvarez et al. (2018)[17] reported average upstream methane emissions of 2% and Howarth (2014)[18] reported methane emissions from unconventional gas fields such as the Montney in northeast B.C., where most of the gas for LNG would come from, ranging from 2.2% to 4.3%.

The Canada Plan recognized this underestimation of methane in the NIR and stated "scientific studies indicate methane emissions have been historically underestimated, so while progress has been made, more work is required to improve methane measurements" (page 53). The B.C. Oil and Gas Commission also sponsored a 2021 study that showed "methane emissions are 1.6–2.2 times current federal inventory estimates" [19].

Notwithstanding the findings that Canada's NIR methane estimates are likely vastly underestimated, Figure 4 assumes that they are correct and that the emissions reduction targets in the B.C. and Canada plans as illustrated in Figure 3 will achieved by 2030 (the only adjustments made in Figure 4 are changing the 100-year global warming potential of methane from 25 to 28 and the 100-year global warming potential of nitrous oxide from 298 to 265 to reflect updates in the IPCC 5th assessment report[20]). The emissions from the liquefaction process are also illustrated in Figure 4 assuming 0.16 and 0.8 tonnes of emissions per tonne of LNG produced for Kitimat LNG and Cedar LNG, respectively.

Without LNG, production of gas for domestic consumption would emit about 4 megatonnes per year in 2050 as illustrated in Figure 4. This level of emissions may be manageable with technologies like carbon capture and storage or purchased carbon credits to achieve B.C.'s and Canada's net-zero target. With the LNG exports assumed in the CER forecast, emissions from gas production and liquefaction would exceed 18 megatonnes per year, or 362% more than domestic consumption alone – and this assumes that methane emissions are not underestimated and all oil and gas sector reduction targets in the B.C. and Canada plans are reached (these targets are aspirational, not legal requirements). If realistic methane emissions were considered, and/or the aggressive emissions reduction targets for methane and the overall oil and gas industry

[17] Ramón A. Alvarez et al., "Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain," *Science* 361, no. 6398 (2018), (PDF) Assessment of methane emissions from the U.S. oil and gas supply chain (researchgate.net) .

[18] Robert W. Howarth, "A Bridge to Nowhere: Methane Emissions and the Greenhouse Gas Footprint of Natural Gas," *Energy Science and Engineering* 2, no. 2 (2014), https://onlinelibrary.wiley.com/doi/abs/10.1002/ese3.35 .

[19] David R. Tyner and Matthew R. Johnson, Where the Methane Is—Insights from Novel Airborne LiDAR Measurements Combined with Ground Survey Data, *Environmental Science & Technology* 2021, 55, 14, 9773-9783, https://pubs.acs.org/doi/10.1021/acs.est.1c01572 .

[20] Global Warming Potential Values, Greenhouse Gas Protocol, https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf .

were not achieved, the situation would be even worse. And worse still if methane was considered using a 20-year global warming potential for methane rather than 100 years - total emissions from gas production and pipelines would increase by an additional 22% after 2030 even if the methane reduction targets were reached.

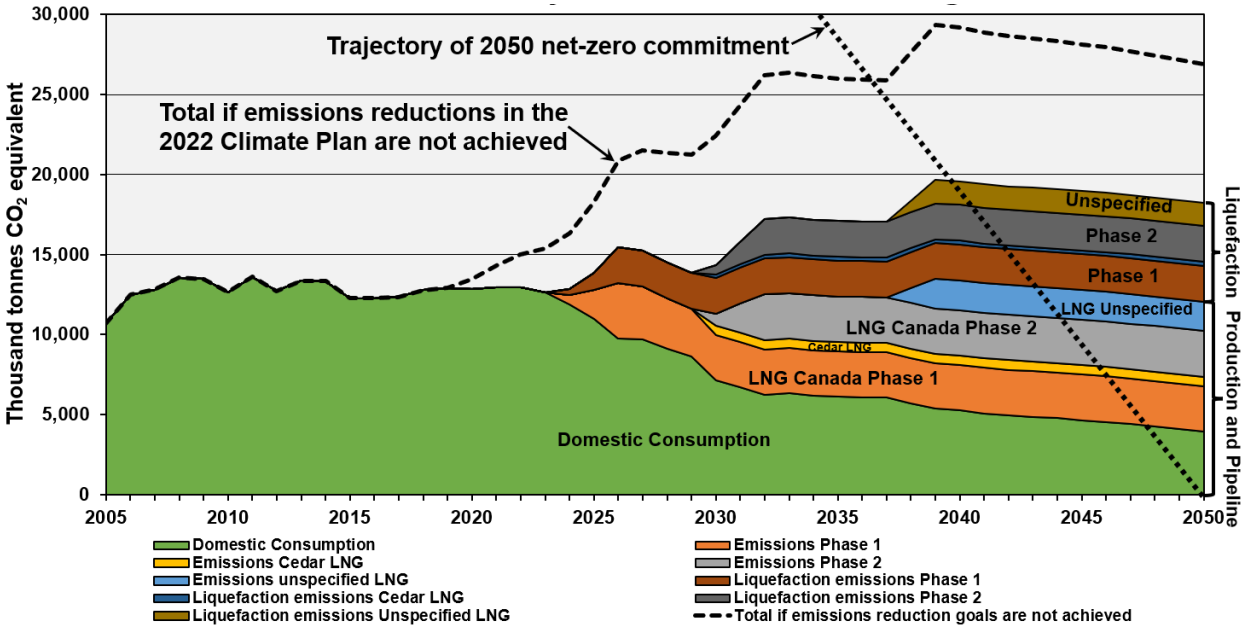

Figure 4 – Emissions from LNG and domestic consumption assuming reduction targets in the B.C. and Canada plans are reached and methane emissions in the NIR are not underestimated. Also shown are total emissions if the emissions reduction targets are not reached (see text). A 100-year global warming potential for methane and nitrous oxide is assumed.

Figure 5 illustrates emissions from all sectors of the B.C. economy through 2019, and the projection of emissions from natural gas production and liquefaction to 2050 (as shown in Figure 4). Also illustrated are the overall B.C. Plan emissions reduction targets of 40% from 2007 levels by 2030 and net-zero by 2050. Emissions from the oil and gas sector and LNG would mean that if all other sectors of the B.C. economy reduced emissions to zero, 18 megatonnes from LNG and domestic gas production would remain in 2050, equivalent to nearly 30% of current B.C. emissions, which would have to be removed by other means to achieve net-zero. If methane and overall oil and gas sector reductions in the B.C. and Canada plans were not achieved, up to 27 megatonnes, or more than 40% of current B.C. emissions, would have to be removed using technologies such as carbon capture and storage and/or direct air capture to meet the net-zero target, which would be cost-prohibitive at this scale[21] (see Figure 5).

[21] Carbon capture and storage (CCS) is expensive and energy intensive. Worldwide operational and under construction plants total just 40 megatonnes per year of capacity, most of which is utilized for enhanced oil recovery. CCS is not feasible in the Kitimat area due to the geology, hence a pipeline would be needed to transport carbon dioxide from liquefaction to a suitable location adding yet more expense, although CCS at high-cost could be deployed to some extent where the gas is produced (see the appendix of *Global Status of CCS 2021* for a summary of CCS plants in operation or under construction, https://www.globalccsinstitute.com/wp-

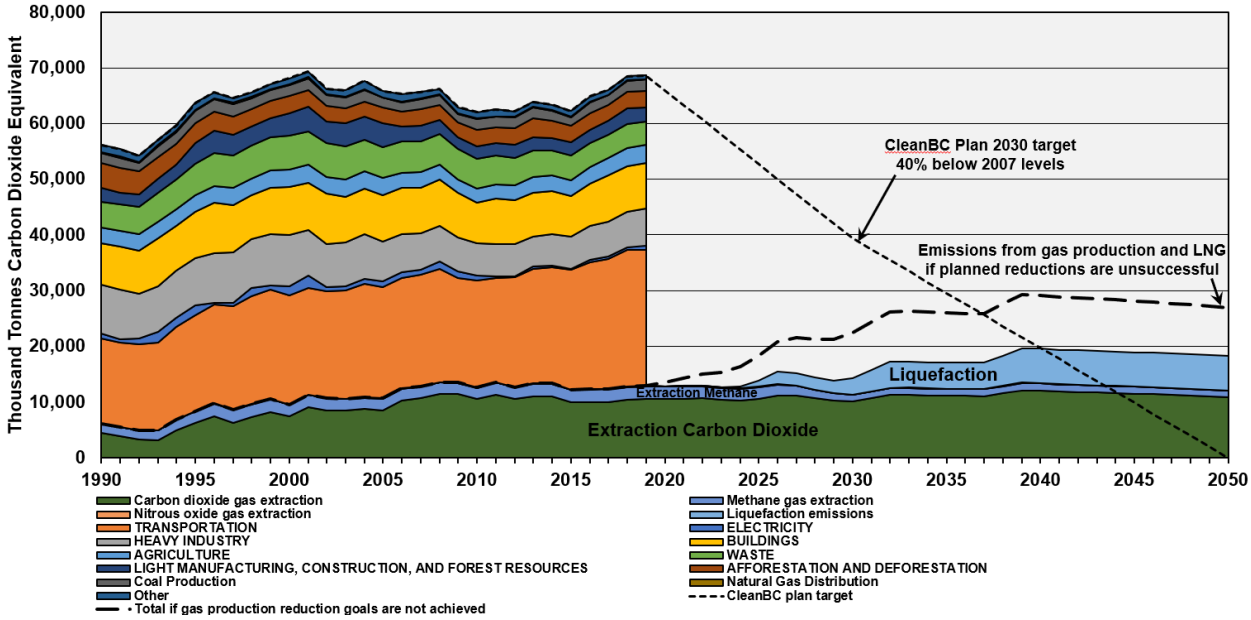

Figure 5 – B.C. emissions by sector from the NIR including projections with and without reductions from the oil and gas sector in the B.C. and Canada Plans. The reduction trajectory committed to in the B.C. Plan (40% from 2007 levels by 2030 and net-zero by 2050) is also shown (see text). Emissions from gas extraction and liquefaction would be considerably higher if methane emissions were corrected for known underestimates in the NIR and/or if methane was considered on a 20-year basis (the figures in this submission, the Cedar application, and the NIR consider methane on a 100-year basis).

As noted previously, B.C.'s emissions have been growing, not declining, despite earlier government plans to reduce them. The current policy of the B.C. government to allow LNG exports and the production of the gas required for them is certain to doom any hope of achieving net-zero emissions by 2050 as required in its CleanBC Plan.

Emissions outside of B.C. (Downstream Shipping, Regasification and Combustion)

Downstream emissions from LNG include boil-off gas and its combustion during shipping, as well as emissions from regasification and final combustion. The amount of boil-off gas depends on the length of the tanker voyage and is typically "between 0.10 to 0.15% of the cargo per day for laden (loaded) voyage and from 0.06 to 0.10 % for ballast voyage"[22], as well as boil-off gas created during loading and unloading. In most cases boil-off gas is used to fuel the ship, however, in some cases it is reliquefied and returned to the cargo. Ships fueled almost entirely by boil-off gas travel at slower speeds (14 knots) than ships with dual-fuel engines (19 knots)[23]. The

content/uploads/2021/11/Global-Status-of-CCS-2021-Global-CCS-Institute-1121.pdf). Direct air capture is even more expensive than CCS and has less than 0.02 megatonnes of worldwide capacity (see https://www.iea.org/reports/direct-air-capture).

[22] Problem of Boil-off in LNG supply chain, Transactions on Maritime Science 02(02):91-100, (PDF) Problem of Boil - off in LNG Supply Chain (researchgate.net).

[23] The LNG Shipping Forecast: costs rebounding, outlook uncertain, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/02/The-LNG-Shipping-Forecast-costs-rebounding-outlook-uncertain-Insight-27.pdf .

voyage from Kitimat to Singapore, for example, is 6,783 nautical miles and would take between 15 and 20 days depending on the tanker used[24]. Boil-off during this voyage would be about 3% of the cargo. Boil-off gas generated during loading and unloading of an LNG tanker is typically at an 8-10 times higher rate than tankage boil-off but occurs over a much shorter period. Boil-off from loading, unloading and regasification is approximately 1.5% of the cargo.

When burned, natural gas produces about 57% of the emissions of bituminous coal, which is often used as a justification for using LNG claiming it will displace higher emitting coal plants in Asia and reduce climate change. However, LNG has much higher upstream emissions than coal before arriving at the burner tip, hence electricity generated by LNG can be worse than coal if full-cycle emissions are considered on a 20-year timeframe.

Comparison to Other Studies

Table 1 compares the life-cycle emissions of Cedar LNG and LNG Canada to other studies from the U.S. for both the 20-year and 100-year global warming potential of methane. Gas production emissions for Cedar LNG and LNG Canada are much lower than in the U.S. data, particularly for the 20-year estimates, because of the underestimate of methane emissions in the Canadian data. Correction of the methane data may be available in the next release of the NIR as noted in the Canada Plan.

LNG Canada			NETL (2014)		NETL (2019)	
Process	100 year	20 year	100 year	20 year	100 year	20 year
Production	11%	15%	16%	29%	23%	29%
Liquefaction	5%	5%	10%	8%	6%	7%
Tanker	2%	2%	4%	4%	4%	4%
Regasification	1%	1%	3%	6%	1%	1%
Combustion	81%	77%	66%	53%	66%	58%
Cedar LNG			NETL (2014)		NETL (2019)	
Process	100 year	20 year	100 year	20 year	100 year	20 year
Production	11%	14%	16%	29%	23%	29%
Liquefaction	3%	2%	10%	8%	6%	7%
Tanker	2%	2%	4%	4%	4%	4%
Regasification	1%	1%	3%	6%	1%	1%
Combustion	83%	80%	66%	53%	66%	58%

Table 1 – Life-cycle emissions of Cedar LNG and LNG Canada by process compared to U.S. National Energy Technology Laboratory LNG studies[25],[26] (see text). This comparison is for LNG shipped from Kitimat to Asia (this submission) compared to LNG shipped from the U.S. Gulf Coast to Europe, which is a similar distance.

Comparisons of LNG-generated electricity in Asia to alternative coal-fired electricity generation often uses older coal plants running at thermal efficiencies of less than 35% for comparison. Best

[24] Sea distances/Port distances, https://sea-distances.org/ .
[25] Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, U.S. National Energy Technology Laboratory, DOE/NETL-2014/1649, Life Cycle GHG Perspective Report.pdf (energy.gov) .
[26] Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States: 2019 UPDATE, September, 2019, DOE/NETL-2019/2041, 2019 NETL LCA-GHG Report.pdf (energy.gov) .

technology coal now has efficiencies of up to 45% and, when compared to electricity generated by LNG-fueled combined-cycle gas, has a substantial emissions benefit over the 20-year timeframe[27]. So not only will emissions from LNG exports compromise B.C.'s ability to meet its commitment to net-zero by 2050, they will make the global warming problem worse over the critical next few decades.

Conclusion

Although the Cedar LNG project is small in terms of total emissions compared to LNG Canada, it would add yet more emissions to the already insurmountable emissions load that will be created by the LNG Canada project. Table 2 summarizes incremental and cumulative emissions in 2050 from the four potential LNG projects discussed herein, as well as the cumulative percentage increase in emissions each project represents compared to domestic consumption.

Emissions beyond domestic requirements in 2050 from LNG development			
Project	Incremental Emissions (megatonnes/yr)	Cumulative Emissions (megatonnes/yr)	Cumulative Percentage Increase
Domestic consumption	3.95	3.95	0%
LNG Canada Phase 1 gas production and liquefaction	5.08	9.03	129%
Cedar LNG gas production and liquefaction	0.83	9.86	150%
LNG Canada Phase 2 gas production and liquefaction	5.08	14.94	278%
Unspecified LNG in CER production forecast	3.31	18.25	362%

Table 2 – Carbon dioxide equivalent emissions in 2050 from gas production and liquefaction for the four potential LNG projects discussed in this submission (see text). These emissions assume a 100-year global warming potential for methane and nitrous oxide and also assume that methane and overall oil and gas sector emissions reductions by 2030 in the B.C. and Canada plans will be achieved.

Table 2 is a best-case scenario, as it assumes that methane emissions will be reduced 75% by 2030 and that overall emissions from B.C.'s oil and gas industry will be reduced 42% from 2019 levels by 2030 as stated in the 2022 Canada Plan. This may not be feasible. Furthermore, Table 2 uses methane emissions from the 2021 NIR which are known to be underestimated. Methane is a very potent greenhouse gas, 28 times that of carbon dioxide over 100 years and 84 times carbon dioxide over 20 years. If corrected estimates of methane emissions were used, the emissions in Table 2 would be considerably higher. Also, the NIR reports methane on a 100-year global warming potential basis. If the 20-year basis were considered, greenhouse gas emissions in Table 2 would be higher still, and the decades between now and 2050 are extremely important in the global warming battle.

[27] BC's Carbon Conundrum: Why LNG exports doom emissions-reduction targets and compromise Canada's long-term energy security, Canadian Centre for Policy Alternatives, https://policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office/2020/07/ccpa-bc_BCs-Carbon-Conundrum_full.pdf .

Notwithstanding these deficiencies, Table 2 outlines an insurmountable problem if these LNG projects are allowed to go ahead. Even removing four megatonnes of domestic consumption emissions to meet the net-zero target in 2050 would require costly negative emissions technology of questionable feasibility. If Phase 1 of LNG Canada is allowed to go ahead this problem would more than double to nine megatonnes. If Cedar LNG were added to this, emissions needing to be removed by negative emissions technologies would be 2.5 times that of domestic consumption alone. If Phase 2 of LNG Canada were added it would nearly quadruple the problem, and if the unspecified LNG project in CER's gas production forecast were added the emissions problem would be 4.6 times that of domestic consumption alone. Correcting methane underestimation and considering methane's 20-year global warming potential would make the size of this mitigation problem larger still.

There is clearly no scope for allowing any of these LNG projects to go ahead if B.C. and Canada are serious about meeting their net-zero commitments by 2050. These projects present an insurmountable emissions problem even if every other sector of B.C.'s economy could be reduced to net-zero by 2050, which in itself would be an extremely difficult challenge.