

Backgrounder on Carbon Exports

Prepared by UBCC350.org

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Overview

Fossil fuels release predictable amounts of CO₂ when burned, thus making it relatively straightforward to estimate downstream CO₂ emissions based on quantities exported. We have estimated current and projected CO₂ emissions from each of natural gas, coal, and crude oil separately. The following table summarizes our estimates, with all figures in million tonnes CO₂ per year.

	Oil	Coal	Natural Gas	Total
Current Exports	38	82	52	172
Projected New Exports	169	34	90	293
Projected Total Exports	207	116	142	465

These figures reflect preliminary estimates, based on assumptions and sources as noted below. We have attempted to highlight areas of uncertainty in the discussion that follows, and welcome additional information and corrections (at khar1958@gmail.com).

Several conclusions are noteworthy:

- We estimate BC's current carbon exports to be roughly 2.5 times within-province CO₂eq (2009) emissions of 67 million tonnes.
- BC's carbon exports are projected to increase significantly. The Northern Gateway pipeline alone would increase BC's carbon exports by 82.5 million tonnes per year, while the proposed expansion of the Kinder Morgan pipeline to Burnaby would increase carbon exports a further 86.4 million tonnes. Each of these projects is larger than BC's current within-province emissions of 67 million tonnes per year.
- While the province's efforts to reduce greenhouse gas emissions within BC are laudable, even if we meet our 2020 target (which will be extremely difficult, if not impossible, as noted below, with up to 11 million tonnes of new emissions from natural gas fracking and LNG production), that 22 million tonne per year reduction will be overwhelmed thirteen-fold by a potential *increase* in our CO₂ exports to other jurisdictions of roughly 300 million tonnes.

Current CO2 Exports from Oil: 38 million t/y

The Kinder Morgan Trans Mountain pipeline transports crude oil from Alberta to Greater Vancouver and, via a spur line, to Washington State. It has a capacity of 300,000 b/day. Kinder Morgan recently received permission from the National Energy Board to increase its tanker exports from the Westridge Marine Terminal in the Port of Vancouver to 79,000 b/day. The remaining capacity of 221,000 b/d is divided between the Chevron refinery in Burnaby (which has a capacity of 55,000 b/d¹) and a pipeline spur to Washington State.

Unfortunately, publicly available Statistics Canada data do not allow us to determine what fraction of the remaining land shipments are exported to the US. Conservatively, we assume that the Chevron refinery is operating at capacity (55,000 b/d), which leaves 166,000 b/d to be transported by pipeline to refineries in Washington State. That is within with the capacity of the Kinder Morgan Puget Sound Pipeline spur of 180,000 b/d.²

166,000 (WA) + 79,000 (tankers) = 245,000 b/day exports or 89.49 million b/y
Using conversion factor of 0.43 tonnes CO₂/bbl crude oil, this translates to 38.5 Mt/y CO₂.

Projected New CO2 Exports from Oil: 169 million t/y

The capacity of the proposed Enbridge Northern Gateway project is 525,000 b/day. Using the same conversion factors as above, this would result in the release of 82.5 million t/y of CO₂ (0.43 t CO₂/bbl x 365.25 days/y x 525,000 b/d).

Kinder Morgan has announced its intention to increase the current 300,000 b/d capacity of its Trans Mountain pipeline to 850,000 b/day.³ Again, using the same conversation factors, this 550,000 b/d increase translates to 86.4 million t/y of additional CO₂ exports.

Current CO2 Exports from Natural Gas: 52 million t/y

BC currently produces 3 BCF/day or 1.1 TCF/y of natural gas, only 16% of which is consumed in BC. Of the 84% exported from British Columbia in pipelines, 41% is delivered to the US and 43% to other provinces in Canada.⁴

¹ <http://www.chevron.ca/operations/refining/default.asp>

² http://www.kindermorgan.com/business/canada/puget_sound.cfm

³ <http://www.calgaryherald.com/business/Kinder+Morgan+continue+Trans+Mountain+expansion+planning/6186387/story.html>

⁴ Province of British Columbia. 2012. British Columbia's Natural Gas Strategy: Fueling BC's Economy for the Next Decade and Beyond. P. 4.

Since our focus is on carbon being exported beyond BC's borders (as compared to emissions within the province), we have included the natural gas being shipped to other provinces as well as that being transferred to the US in our analysis.

$$0.84 \times 1.1 \times 10^6 \text{ MCF/day} \times 1/35.3 \text{ CM/CF} \times 2 \text{ kg CO}_2\text{e/CM}^5 \times 0.001 \text{ t/kg} = 52 \text{ M t CO}_2\text{/y}$$

Projected CO2 Exports from Natural Gas: 90 million t/y

BC's Natural Gas Strategy calls for an increase in production from 1.1 to 3 TCF/y.⁶ This gas is slated for export through three new LNG terminals on the North coast. Using the same emission factors as above, 1.9 TCF/y of additional exports translates to 86 M t/y of CO2.

LNG exports have been touted by the province as a substitute for dirtier fossil fuels, such as coal and oil. However, economists are advising that we need to begin reducing reliance on even natural gas within just a few years if we are to meet global reduction targets recommended by the scientific community by 2050.⁷ In other words, we cannot afford a "transition fuel." We need to start moving to renewable energy now.

It is worth noting that increased production of natural gas for export will also increase emissions within British Columbia from activities such as leakage from fracking activities, venting of CO2 (present at particularly high levels in one BC gas reservoir under development), and significant energy production needed to liquefy natural gas for export. The provincial government estimates that these activities will increase CO2eq emissions within BC by up to 11 million t/y by 2020,⁸ which will make it extremely difficult at best, and perhaps impossible, for BC to meet its target to reduce within-province emissions by 22 million t/y by 2020.

⁵ <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1>

⁶ Province of British Columbia. 2012. British Columbia's Natural Gas Strategy: Fueling BC's Economy for the Next Decade and Beyond. P. 2.

⁷ Pembina Institute and David Suzuki Foundation. 2011. Is Natural Gas a Climate Change Solution for Canada?

⁸ Personal communication, BC Climate Action Secretariat.

Current CO2 Exports from Coal: 82 Mt/y

BC exports coal from mines in the US, BC, and other provinces. The Ridley Terminal in Prince Rupert shipped 8.3 million tonnes of coal in 2010.⁹ In 2011, the Port of Vancouver exported 32.7 million tonnes,¹⁰ from the Westshore and Neptune Terminals, both of which have or are undergoing significant expansions. Assuming an average of 2 t CO₂/t coal,¹¹ the combined total of 41 Mt/y of coal exports will generate 82 Mt/y of CO₂ beyond BC's borders.

Projected CO2 Exports from Coal: 34 Mt/y

BC's Jobs Strategy calls for 8 new mines and 9 expansions of existing mines by 2015.¹² Although the mines in question are not identify by name, there is no shortage of proposals for new coal mines under development in British Columbia. Based on 8 new coal mines at or already through the environmental assessment phase as of 2011, the Dogwood Initiative estimated an increase in global emissions by 34 million tonnes CO₂/year.¹³

⁹ <http://www.rti.ca/pdf/RTI-Arch-Coal-Announcement-Jan-2011.pdf>

¹⁰ Port of Vancouver, 2011 Statistics Overview Report, available at <http://www.portmetrovancover.com/en/about/factsandstats.aspx>.

¹¹ <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1#section3>

¹² Government of British Columbia. 2011. Canada Starts Here: The BC Jobs Plan.

¹³ Dogwood Initiative. 2011. BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution.