

Backgrounder on Carbon Exports
Prepared by UBCC350.org
October, 2012

Overview

Fossil fuels release predictable amounts of CO₂ when burned, thus making it relatively straightforward to estimate downstream CO₂ emissions based on the quantities of each fuel exported. We have estimated current and projected CO₂ emissions from each of BC's natural gas, coal, and crude oil exports 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	86	289
Projected Total Exports	207	116	138	461

These figures are 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 or 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. Together they would contribute global emissions of 2.5 times BC's annual (2009) emissions.
- 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 16 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 projected *increase* in our CO₂ exports to other jurisdictions of almost 300 million tonnes.
- Existing and proposed carbon exports from British Columbia could be more than ten times larger than the province's legislated 2020 greenhouse gas target.

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 has secured 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 (55,000 b/d capacity¹) and a pipeline spur to refineries and ports in Washington State.

Unfortunately, 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 full capacity (55,000 b/d), which would leave 166,000 b/d to be transported by pipeline to Washington State. That is consistent 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/d exports

245,000 b/d x 365.25 d/yr x 0.43 tonnes CO₂/b = 38.5 Mt CO₂/y

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

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.

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.

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

Projected New CO₂ Exports from Natural Gas: 86 million t/y

BC's Natural Gas Strategy calls for an increase in production from 1.1 to 3 TCF/y.⁵ 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 2050.⁶ In other words, we cannot afford a "transition fuel." Now is not the time to invest in new infrastructure that will last for decades. We need to start moving to renewable energy now.

It is worth noting that increased production of natural gas for export via hydraulic fracturing ("fracking") will also significantly increase emissions within British Columbia. This includes production emissions from sources such as leakage at the well-head and venting of CO₂ that contaminates the natural gas (present at particularly high levels in one BC shale gas reservoir). The provincial government estimates that these activities will increase CO₂eq emissions within BC by up to 11 million t/y by 2020.⁷ In addition, liquification of natural gas for export is extremely energy intensive, with the first three plants under development projected to use 85% as much electricity as BC's entire residential sector. Even with the first two plants relying on hydro-power, the third plant's combustion of natural gas for energy will contribute a further 5 million t/yr of CO₂ emissions in BC. (And that does not include the opportunity cost of diverting massive quantities of hydropower for LNG plants, rather than as a substitute for fossil fuel uses, such as transportation, within BC.) Together, these additional emissions of up to 16 million tonnes/yr 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 Province of British Columbia. 2012. British Columbia's Natural Gas Strategy: Fueling BC's Economy for the Next Decade and Beyond. P. 2.

⁶ Pembina Institute and David Suzuki Foundation. 2011. Is Natural Gas a Climate Change Solution for Canada?

⁷ 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, and the quantities exported have been growing rapidly. The Ridley Terminal in Prince Rupert shipped 8.3 million tonnes of coal in 2010.⁸ In 2011, the Port of Vancouver exported 32.7 million tonnes⁹ from the Westshore and Neptune Terminals, both of which have or are undergoing significant expansions. Assuming an average of 2 t CO₂/t coal,¹⁰ 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 2015.¹¹ Although the mines in question are not identified 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.¹² This estimate is conservative given the rapid increases in coal exports in the last few years, and the growing pressure for export of US coal to Asia as the US shifts from reliance on coal to fracked natural gas.

⁸ <http://www.rti.ca/pdf/RTI-Arch-Coal-Announcement-Jan-2011.pdf>

⁹ Port of Vancouver, 2011 Statistics Overview Report, available at <http://www.portmetrovancover.com/en/about/factsandstats.aspx>.

¹⁰ <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1#section3>

¹¹ Government of British Columbia. 2011. Canada Starts Here: The BC Jobs Plan.

¹² Dogwood Initiative. 2011. BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution.