

From: Adebola S. Kasumu, Sarah M Jordaan, Vivian Li, James W. Coleman, Jeanne Liendo
To: John Horgan, Premier of British Columbia
Date: January 30, 2018
Re: **THE GREENHOUSE GAS IMPLICATIONS OF EXPORTING LNG FROM B.C.**

You've been off to Asia touting the benefits of B.C.'s liquefied natural gas (LNG). Back at home, [some are questioning](#) the environmental benefits of LNG. However, the evidence shows that B.C. LNG has great potential to lower anticipated global emissions if it displaces higher-carbon-emitting options by lowering emissions in Asia.

Climate change and growing demand for energy are two of the most pressing challenges in energy policy today. Thus a central question for energy policymakers is what role natural gas, a cleaner-burning fossil fuel, should play in meeting the world's ever-increasing energy demand.

Hydraulic fracturing and horizontal drilling have created a recent boom in North American natural gas production, bringing prices down and creating an impetus for the natural gas industry to find alternative markets across the globe by means of LNG.

The effects of this booming trade on overall greenhouse gas emissions, however, has yet to be fully studied.

In work we have recently done, we set out to create a Life Cycle Assessment of electricity generation that combines the effects of transport distances between exporting and importing countries, country-level infrastructure in importing countries, and the fuel sources displaced in importing countries.

We used prospective LNG exports from British Columbia to perform a Life Cycle Assessment LCA with a three-step approach:

- A review of viable electricity generation markets for LNG.
- Totalling the development of results for greenhouse gas emissions that account for transporting the LNG to importing nations, and building the infrastructure required for LNG power generation and delivery.
- Estimating the emissions from the electricity sector that LNG would displace in various scenarios of the types of electricity generation.

Life cycle greenhouse gas emissions depend on country-level infrastructure (specifically, the efficiency of its power plants, transmission and distribution losses and LNG ocean transport distances) as well as the assumptions on what is displaced in the domestic electricity generation mix.

In our study, we focused on five nations that currently import LNG (Japan, Korea and Taiwan, China and India, who collectively represented almost 70 percent of the world's LNG imports in 2013) and assessed how much greenhouse gas would be displaced by LNG from B.C.

Overall our results suggest that there is a net environmental benefit in terms of the life-cycle greenhouse gas emissions for LNG exported from Canada to countries in Asia if it is burned to displace higher-carbon electricity.

The magnitude of that reduction depends on the type of electricity generation that is displaced. For example, one scenario could be early retirement of dirtier plants or plants not built because LNG has displaced them in the market. The real challenge lies in the question of how to balance the potential benefits with the fact that emissions in B.C. would increase with the increased natural gas production, liquefaction, and export facilities.

Further complicating the question of provincial emissions, the other conclusion is that further detailed studies need to be undertaken to provide more clarity on a range of variables that exist in all studies in this area.

In particular our results confirm the need to improve Canadian data, which currently only measures four broad categories whereas the US has six measures, which are further refined by disaggregating emissions by facility type.

This permits much easier identification of areas for cost-effective emissions controls.

The broad picture, however, is clear. LNG exports will contribute to lower greenhouse gas emissions in importing countries, provided it is used for electricity generation in countries with higher-carbon power sectors. The political challenge for Canada is how to balance the trade-off between the potential for lower emissions overseas and increased domestic emissions (more specifically, those in British Columbia).

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