

How to make the liquefied natural gas industry more sustainable

November 2 2018, by Arvind P. Ravikumar



Credit: Petr Kratochvil/Public Domain

The [recently announced](#) \$40 billion liquefied natural gas (LNG) project in northern British Columbia represents the single largest private sector investment in Canadian history. And construction will soon begin on [two more LNG projects](#), one in Nova Scotia and another in British Columbia.

While [oil and gas companies and local media](#) are touting LNG's economic benefits, others are [raising concerns](#) about its impact on Canada's climate commitments.

What's the right answer? It turns out, it depends on how Canada decides to regulate LNG, and the oil and gas industry.

The pro-environment case for LNG is simple. Natural gas is a cleaner burning fuel than coal. Replacing [coal use in China](#) with Canadian natural gas will reduce global greenhouse gas emissions as well as improve air quality in Asia. Plus, the emissions associated with shipping LNG to China from Canada are about 30 per cent less than those produced by shipping LNG from Qatar or Australia —[China's current major suppliers](#)—because of the [shorter distances](#).

The practical case is simpler. In its [recent report](#) on the global LNG outlook, Bloomberg New Energy Finance projects LNG demand will grow to 450 million metric tonnes per year (MMtpa) by 2030. Most of this demand growth (86 per cent) comes from Asia, with China leading the pack. The argument goes—someone is going to supply Asia's need for LNG, why shouldn't it be Canada?

Is sustainable LNG possible?

Sustainable development of a Canadian LNG industry is indeed possible, but it depends on effective management of two critical environmental risks: [methane emissions](#) from natural gas production and electricity emissions associated with powering the LNG facility.

Methane is a potent greenhouse gas. The warming potential of [methane](#) is 36 times greater than carbon dioxide over a 100-year period. In its [latest report, the Intergovernmental Panel on Climate Change \(IPCC\)](#) says stopping methane leaks is key if we are to keep global warming

below 1.5 °C.

Worryingly, [several recent](#) scientific studies show [higher methane emissions from oil and gas production](#) in British Columbia and Alberta [compared to official estimates](#). High [methane leakage can negate](#) the greenhouse gas emissions advantages of using natural gas over coal.

The key to developing a low-carbon LNG industry is to reduce the methane emissions associated with production, transportation and liquefaction of natural gas. The federal government [recently finalized regulations to reduce methane emissions from the oil and gas industry](#). Similar regulations in Alberta and British Columbia will go a long way to bolster the case for sustainability.

Innovative emissions detection

Several start-up companies in Canada and the United States are [developing technologies](#) that promise faster and more cost-effective detection of methane leaks. These technological innovations use [drones](#), [planes](#) and [even satellites](#) to survey large areas quickly, likely providing cheaper ways to find methane leaks.

Our recent study —the [Stanford/EDF Mobile Monitoring Challenge](#) —assessed ten leak detection technologies on platforms such as trucks, drones and planes. This study was conducted in a single-blind format —participating teams did not know the location or size of leaks that they were tested on. We should have the results publicly available by early next year.

Furthermore, in a sign of growing interest in technology innovation, the Oil and Gas Climate Initiative, an industry-led initiative focused on climate solutions, [recently invested](#) in companies developing new methane emissions detection technologies.

Until recently, regulations prescribed the use of traditional approaches to leak detection at oil and gas facilities. Aggressive methane mitigation policies that allow for the use of new technologies can not only reduce emissions at lower cost, but also help energize Canada's innovation ecosystem.

What about the LNG plant?

But stopping methane leaks is not enough.

The transformation of natural gas to LNG —cooling it to -162°C —is an energy intensive process. If the LNG industry is to be a low-carbon industry, it must include a low-carbon liquefaction process.

The best-case scenario here is to use low or zero-carbon energy sources. Luckily, British Columbia's largely hydroelectric grid provides just such a source. With additional renewable energy sources, it is possible to build a low-carbon LNG plant.

However, LNG Canada [currently plans to use](#) a combination of renewable sources and [natural gas](#) to power the new B.C. plant.

Even though this project is touted to have the lowest carbon intensity of any large-scale LNG plant operating in the world, there is a cleaner way to do this —using the B.C. grid electricity.

Natural gas is cleaner than coal, even with [relatively high levels of methane leakage](#). But in a world that is seeing increasing damages from climate change, "better than coal" is a very low bar.

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