Western Canadian LNG:
A Pathway to Global GHG Reduction and Reconciliation

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Western Canada is positioned to play a critical role in exporting liquefied natural gas (LNG) to Asian markets as world energy production transitions to lower-carbon intensity fuels. We assess the feasibility of this role using a case study if Japan replaces its electricity generation coal feedstock with western Canadian LNG, and review the effect on greenhouse gas (GHG) emissions within Canada and globally.

The benefits of LNG must be balanced against socioeconomic, environmental and cultural costs to Indigenous peoples, who have historically been exploited by Canadian resource development. To ensure mutual benefit from LNG developments to the nearby Haisla Nation (Fig1) for instance, we identified impact mitigation measures around Kitimat, British Columbia (B.C.)[1,2,3].

Using available life-cycle assessments, we found that a Japan power generation feedstock transition from coal to Canadian LNG could result in GHG emissions reduction of up to 512 kilograms of carbon dioxide equivalent per megawatt-hour[4,5,6,7,8] (Fig2). Total coal use phase-out in Japan could result in annual global net GHG emissions reductions exceeding 130 $MtCO_2$-eq.

However, LNG export can be viewed as incongruent with B.C.'s GHG reduction goals as the entirety of the LNG Canada project will generate additional annual emissions of 16 $MtCO_2$-eq (~40% of B.C.'s 2030 emissions target)[7,9]. These emissions can be reduced by up to 7.2 $MtCO_2$-eq with project electrification and carbon capture and storage in northeastern B.C.[10,11]. Decarbonizing other emission-intensive sectors could also offset the new emissions created by LNG Canada. LNG Canada's success in policy and community relations can serve as a model for future western Canadian LNG developments, allowing for the benefit of lower-carbon fuels to be shared locally and globally.

By aligning policies and resources, our research shows that LNG could be a pathway to economic reconciliation for Indigenous peoples while contributing to global climate change mitigation.

Footnotes:
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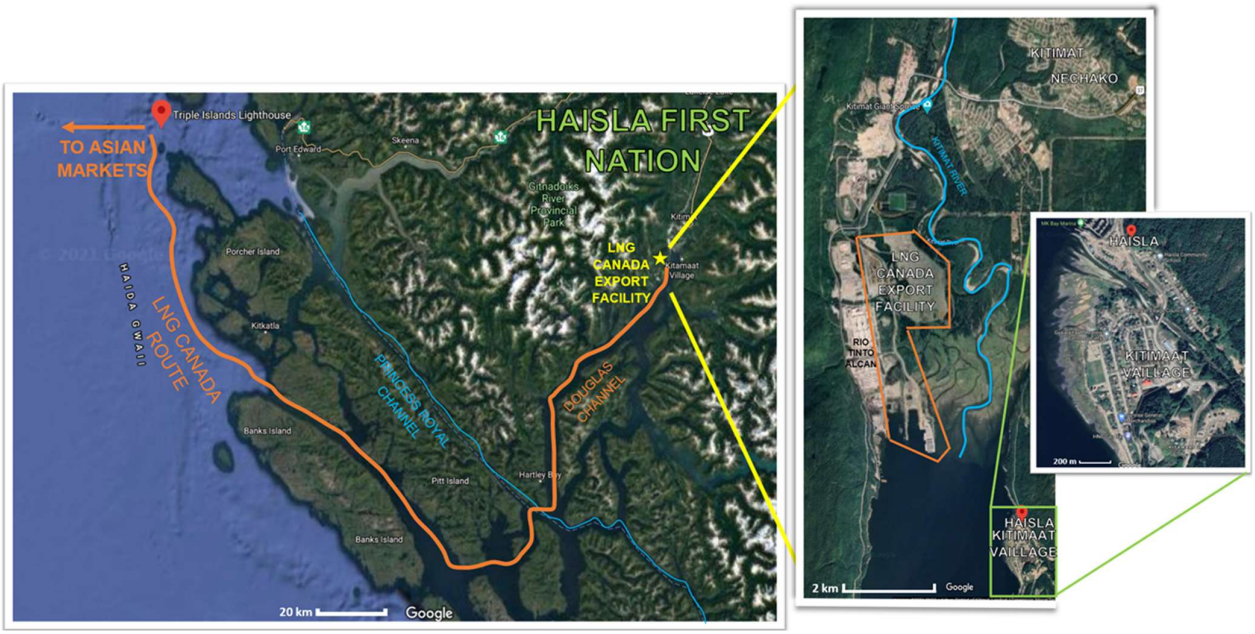

Figure 1. Map of Kitimat, B.C. showing the route and export facility of LNG Canada, as well as the communities surrounding the area, particularly the Kitimaat People of the upper Douglas Channel and the Kitlope People of the upper Princess Royal Channel and Gardner Canal that comprise the Haisla Nation[12].

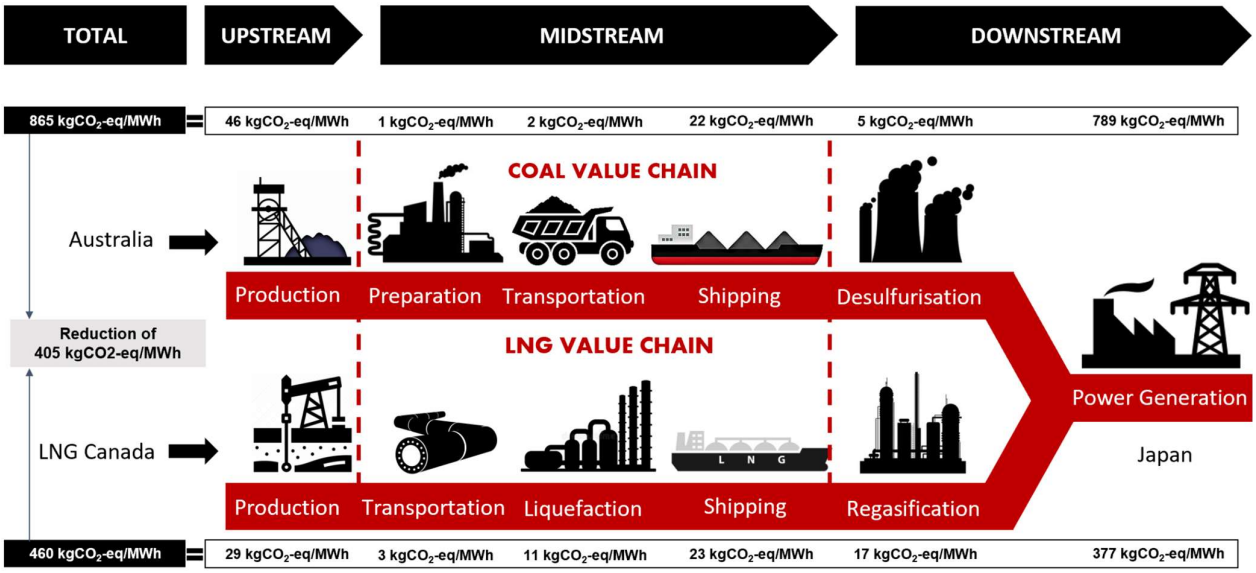

Figure 2. To directly compare different sources of electricity, we consider both coal and LNG in terms of equivalent functional units [kg CO_2-eq/MWh] of energy generated at a power plant. Getting the difference between the life-cycle emissions of coal and LNG, we estimate that global GHG emissions from Japanese power generation can be reduced by 405 kg CO2-eq/MWh by replacing coal feedstock with Canadian LNG[4,5,6,7,8]. This reduction can be as much as 512 kg CO2-eq/MWh if the maximum life-cycle emissions from coal are used. This figure is modified by authors.

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