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Honourable Michelle Mungall
Minister of Energy, Mines and Petroleum Resources
P.O. Box 9060 Stn Prov Govt
Victoria, BC
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RE: 2017 LCFS Pathway Assessment

Minister Mungall:

We greatly appreciate this opportunity to provide comments regarding the British Columbia Greenhouse Gas Reduction Act and the Renewable and Low Carbon Fuel Requirements Regulation (together the BC-LCFS). Clean Energy is North America's largest provider of natural gas motor fuel which includes an increasing amount of renewable natural gas (RNG), also known as bio-methane. Our Canadian sales, construction and service teams are based in British Columbia and continue to actively develop opportunities from coast to coast. We provide the following comments for your consideration.

The findings of the 2014 consultation process found that overall compliance with the BC-LCFS until 2020 would be possible but challenging. In 2016, the Ministry of Energy and Mines concluded that the petroleum industry had not yet taken advantage of significant opportunities to generate compliance credits under the regulation. Given the development of current pathways to reduce the carbon intensity of fuels, Clean Energy strongly recommends not only staying the course with the 10 percent reduction requirement by 2020 but also requiring a 20 percent reduction in carbon intensity by 2030.

The heavy-duty vehicle sector, unlike light-duty, is projected to increase fuel usage due to growth in the economy.   Focusing attention here and utilizing solutions which are available today will be key to meeting the goals of the LCFS especially in the near-term.

Alternative fuel technologies which achieve results but are not only far from being competitive in price but beyond even subsidizing into widespread utilization may hold hope for the future but are not a solution for today or even in a few years. In regard to availability, many technologies have a limited number of vehicle platforms and therefore are severely restricted in the needs they can serve in the transportation sector. Finally, performance in terms of power and range limit the viability of many.

The current pathway assessment predicts the number of natural gas vehicles (NGVs) will increase by 4,375% by the year 2030. At roughly a 25 percent premium to diesel, NGVs are the

most economical alternative to diesel especially when fuel cost savings are taken into account. With well over a hundred different NGV models which cover all medium and heavy-duty weight classes, they are a viable solution for a wide variety of transportation needs. In terms of range, advances in fuel storage now allow for up to 600 miles of range for a class 8 tractor trailer.

In regard to NOx emissions, while new diesel engines simply meet the required U.S. federal standard, many natural gas engines have gone further and are certified to either the California Air Resources Board's optional low NOx or near-zero emissions standards. These engines are therefore certified to produce 50-90 percent fewer NOx emissions than new diesels. Additionally, a recent study[1] conducted by the University of California Riverside, found the actual in-use NOx emissions of the near-zero natural gas engine to be up to 95 percent cleaner than diesel (0.001g/bhp-hr).

The opportunity to reduce GHG, NOx and particulate emissions in the transportation sector via the use of natural gas greatly expands when RNG is paired with these new near-zero natural gas engines. Not only do you get the 90-95 percent reduction in NOx emissions but also a 75-100+% reduction in carbon emissions. As noted by the 2017 Pathway Assessment, carbon emissions from RNG could be equal to electric. Clean Energy currently fuels both the Dallas Area Regional Transit and the L.A. Metro bus fleets with RNG which represent roughly 3,000 buses.

Encouraging local gas utilities to play a key role via the distribution of RNG through their pipes will, based on our experience, increase its usage and production. That said, many of these utilities have been using their inherent monopolistic advantages to try and lock up RNG production upstream of the inlet to their pipes and then the sale of it downstream of their billing meters to their selected customers. These customers are not typically conducive to meeting the goals of the Province's and other province's and state's LCFS'. RNG should be targeted at displacing high volume users of liquid fuels (bunker, diesel and gasoline) before being used to displace, particularly here in BC, the use of clean electricity and locally abundant fossil natural gas for things like providing heat. Unfettered access to RNG must be permitted and encouraged. If local gas utilities are allowed to use ratebase unfairly, it discourages investment of private capital into the RNG marketplace thereby restricting potential competitive infrastructure investment and growth. Utilities low cost of capital combined with insulation from other market forces expands their monopoly supplying gas into the refueling market. We recommend the Province and other stakeholders encourage and support RNG production in a way that does not allow any monopolistic advantages for any entity. The introduction and flow of RNG through utility pipes to end users should be done in the same way fossil natural gas flows today in BC and North America - local gas distributors are simply carriers.

With limited government resources, the new low-NOx natural gas engines fueled with RNG provide the greatest NOx and carbon emission reductions per dollar and can serve as a key strategy in decarbonizing the transportation sector in British Columbia. Thank you for your

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[1] " Ultra Low-NOx Natural Gas Vehicle Evaluation ISL G NZ", College of Engineering for Environmental Research and Technology, University of California at Riverside, February 2016.

leadership, time and consideration of our foregoing comments. We welcome any opportunity to further discuss this important matter.

Regards,