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**RE: ERO # 019-2709**

Established in 1969, Pollution Probe is one of Canada's longest serving and most respected environmental organizations. Pollution Probe has a proven track record of working in successful partnerships with industry and government to develop practical solutions for shared environmental challenges. Its approach is to define environmental problems through research, to promote understanding through education, and to press for practical solutions through advocacy.

Pollution Probe supports the Ontario Government's commitment to develop Ontario's hydrogen economy. For Ontario to meet its emissions reductions targets, and to advance to a net zero economy, all clean energy sources are likely to be needed, and hydrogen has great potential in areas where electrification may not be suitable. That being said, while hydrogen is likely to play a role in meeting our targets, it will not solve every problem.

Pollution Probe has extensive experience in analyzing the potential for hydrogen in stationary energy and in transportation. For example, Pollution Probe completed a study examining the Future of Natural Gas, which included the use of hydrogen for home heating. Pollution Probe also served as the independent evaluator of the Electric and Hydrogen Vehicle Advancement Partnership (EHVAP), which involved assessing the plans of automakers to roll out hydrogen fuel cell vehicles, with the goal of building the foundation for the achievement of Ontario's goal of 5% ZEV sales by 2020. Our transportation program also works closely with the rail and on-road freight sectors in Ontario, which are increasingly assessing the viability of hydrogen fuel cell vehicles to help address fleet emissions.

We have not responded to every question in the consultation and focused on where we feel we can contribute. See our answers below.

**Vision**

1-4. Pollution Probe supports Ontario's efforts. However, the vision needs to be aligned with the ultimate end goal. Currently, the vision primarily emphasizes industrial development, with emissions reduction as a secondary goal. If that is the goal, then the measurement of success should be on industrial development and not on emissions reduction, and funding should primarily be coming from the tax base and not on the energy rate base.

With the Green Energy and Green Economy Act, Ontario experienced difficulty in using an energy program for industrial development, and we must ensure that future hydrogen development is not hampered due to opposition and unclear success metrics.

**Reducing greenhouse gas emissions**

The main opportunities for the development of hydrogen are in those where electrification is likely to be unsuitable or too expensive. Such areas include:

- Heavy duty transportation
- Industrial processes
- Heating

- Energy storage

It is important to be realistic about hydrogen's potential. While it is likely to play a large role in the future, it is not suitable for every energy need. Integrated energy planning that encompasses electricity, thermal, and transportation is required to identify the best areas for Ontario.

The two primary technology contenders for driving low-carbon transportation systems of the future are hydrogen and battery electric platforms. While battery electric systems seem to be gaining in popularity for light duty vehicles, medium- and heavy-duty vehicles such as on-road freight trucks, rail locomotives, and marine cargo ships may be more suited to hydrogen. To illustrate this, almost every heavy-duty engine manufacturer in North America has invested in or acquired one or more hydrogen technology companies in recent years. This speaks to the potential of hydrogen in heavy-duty vehicle classes for which current battery electric technologies are not well suited (due to issues related to size, weight, power, cost, availability, overheating, refueling time, or a combination of those factors). We would be happy to share detailed research outputs and other resources that support these points.

### **Generating economic development and jobs**

The goal of developing a hydrogen economy needs to balance the costs of developing a hydrogen industrial cluster versus the costs of introducing hydrogen in our energy system. As Ontario has learned, an affordable energy system is also crucial for economic development. As such, if the Province is interested in promoting hydrogen economic development, it must ensure that the costs do not fall on energy consumers.

At the same time, it is crucial that the energy services that can benefit the most from hydrogen are promoted. As discussed above, an integrated all-energy plan to meet a net zero target is required to discover where and when hydrogen can or should be used, versus other energy sources.

In addition, innovation and regulatory flexibility will be required to allow for the energy sector to experiment and discover how hydrogen will work and the best locations. Pollution Probe and QUEST have conducted research on the use of Innovation Sandboxes to allow for regulatory experimentation and pilot projects while ensuring that consumers are protected

(<https://www.pollutionprobe.org/innovation-sandboxes-project/>).

### **Using hydrogen where and when it makes sense**

In Pollution Probe's view, a hydrogen strategy should not be finding a use for hydrogen, but rather seeing how it can help us get to a net-zero economy. For that we need to think how all sectors and fuels will work together to get Ontario to that goal, and where hydrogen can play the most efficacious role. That will require an integrated all-energy plan that considers electricity, thermal, transportation and all energy sources, including hydrogen and biomass, and has a net zero economy by 2050 as the goal.

Rather than focusing on the "rainbow of hydrogen," such as green, blue, grey or pink, the focus should remain be on measuring the carbon intensity of the hydrogen used, and progressively moving to zero-emissions hydrogen. As a significant producer of low-carbon electricity, Ontario is well-positioned to build out a low-carbon hydrogen economy.

Forward-looking companies seek to situate themselves in forward-looking jurisdictions, and a net zero by 2050 goal will send clear market signals regarding Ontario's commitment to innovation and sustainable development. Supporting such a goal with an integrated energy plan that lays out a range of possible roles for energy commodities such as hydrogen, electricity and biofuels, would further foster confidence in Ontario as a growth market. Although the public sector should not be expected to fund hydrogen development, the Government should indicate where and how its resources could be used to leverage private sector investment.

Only through such an integrated plan the best sectors and locations where hydrogen can contribute to meeting Ontario's goal can be identified. Determining an optimal role for hydrogen based on what we know today, and providing the flexibility to change that role if needed based on future developments, will be a key function of an integrated energy plan.

We would like to thank the Government of Ontario for the opportunity to comment on the discussion paper, and we look forward to collaborating on developing a hydrogen strategy that is fit for Ontario for the coming years. Please do not hesitate to reach out if you would like to further leverage Pollution Probe's diverse experience and partnerships in this area.