Dear Minister Yurek,

The Atmospheric Fund (TAF) commends the Ontario Government undertaking this initiative to consult with stakeholders on an Ontario hydrogen strategy. Hydrogen has significant potential to reduce carbon emissions across a variety of economic sectors and end-uses. However, there is significant uncertainty around which production methods and end-uses will be economically feasible and environmentally sustainable. Our submission today focuses on the approach that the Ontario Government should take when considering where to put its time, resources, and focus. There is great potential for hydrogen growth in terms of reducing GHGs and creating jobs if done in a targeted and evidence-based manner.

**Do you support Ontario’s efforts to create a hydrogen strategy?**

Yes. With an important distinction, TAF supports a “green” hydrogen strategy. By focusing on “green” hydrogen there is great potential be transformative in our energy system in Ontario.

**How would you refine the vision statement?**

As noted in our opening we recommend focusing on hydrogen when it makes sense environmentally and is economical to do so. This is an important change from simply being “cost-competitive” as we pursue the best avenue to reduce greenhouse gas emissions and support economic growth. The hydrogen strategy also needs to be considered in the context of Ontario’s long-term energy plan.

**TAF recommends the following:**

* ***Focus on areas where the hydrogen life cycle will reduce greenhouse gas emissions while also having potential to become cost-competitive to the existing fuel supply*** that the hydrogen is either replacing or being added to.
* ***The hydrogen strategy needs to be considered in parallel with Ontario’s long term energy plan and related policy and infrastructure decisions around electricity.*** A major increase in the production and use of green hydrogen will have significant impacts on electricity demand and consumption. On the other-hand, hydrogen electrolyzers can provide a variety of valuable grid-services. Systemic, integrated analysis is needed to understand net economic and environmental impacts.

**What should be the key outcomes of Ontario’s hydrogen strategy?**

Not all hydrogen is created equally. Green hydrogen is the lowest carbon variety and should be considered the most desirable and highest priority hydrogen type to create. This is in stark contrast to grey hydrogen that comes from fossil fuels and represents the bulk of current hydrogen production. Blue hydrogen can also be considered especially where it displaces existing demand for grey hydrogen. Similarly, not all hydrogen end-uses are equal in terms of economic feasibility and environmental benefits. Some end-uses are highly unlikely to scale given the availability of other, lower-cost low carbon alternatives.

**TAF recommends the follow:**

* ***The strategy should result in a clear focus on scaling production and use of low-carbon hydrogen with priority on green hydrogen.***
* ***The strategy should result in a prioritized list of end-use applications where evidence supports the potential for sustainability and cost effectiveness.***
* ***The strategy should consider potential to decarbonize Ontario’s existing hydrogen production.*** The replacement of the existing grey hydrogen market is logical for carbon reduction purposes but is also economical as there is already a market demand that can be met with “green” or “blue”[[1]](#footnote-2) hydrogen. This will help with scaling the much more desirable hydrogen versions and lower costs in the long run for producers and consumers operating in the “green” and “blue” hydrogen areas.

Additionally, ***TAF recommends that the Government of Ontario undertake a rigorous technical study to provide a solid foundation for the hydrogen strategy***. The study should be used to determine what end-uses are economically viable and consistent with Ontario’s climate objectives. The study should quantify the potential market demand for green hydrogen for these viable end-use applications and assess the electricity system ramifications of producing these quantities of green hydrogen. This is important because green hydrogen is produced from electricity and the production of green hydrogen will directly impact Ontario’s long term electricity strategy. While Ontario’s overall electricity supply is low-carbon, natural gas fired power plants are expected to be the marginal source of supply to meet demand growth based on current IESO projections. Producing hydrogen using gas-fired powerplants would largely negate the climate benefits of hydrogen. It is vital to understand the growing electricity needs of Ontario and to avoid the increased use of natural gas for power generation.

**How should the hydrogen strategy define and measure success?**

Hydrogen is not a silver bullet for climate change. It has an important role in areas where the direct use of electricity or bioenergy is not viable. However, it cannot do everything, and it should not be expected to take the place of all existing fossil fuels. As an example, electrifying heating with green hydrogen would require five times more green electricity than electrifying heating with heat pumps. Heat pumps in [this study](https://www.iee.fraunhofer.de/en/presse-infothek/press-media/overview/2020/Hydrogen-and-Heat-in-Buildings.html) shows that they are the more effective technology to use here in terms of cost. Moreover, [as demonstrated by Volkswagen](https://www.iee.fraunhofer.de/en/presse-infothek/press-media/overview/2020/Hydrogen-and-Heat-in-Buildings.html), fuel cell electric vehicles require 2-3 times more green electricity to make hydrogen than are required for charging battery electric vehicles. Therefore, it only makes sense to use hydrogen in vehicles that cannot be viably powered by batteries, such as industrial equipment or large trucks.

**TAF recommends the following:**

Success in a hydrogen strategy should be measured by not just the gross production and total use of all hydrogen in Ontario, but the amount of GHG emissions it reduces in targeted sectors. Green hydrogen production should be the priority and there must be an intentional signal in the strategy to move away from high carbon grey hydrogen.

Additionally, it is important that the hydrogen strategy target end-use applications where it could be most impactful. Targeting hard-to-decarbonize industrial applications and select heavy-duty transport vehicle-types are logical places to start given the lack of other viable low-carbon solutions[[2]](#footnote-3). On the other hand, given the availability of more cost effective and established low-carbon technologies for home heating and light-duty vehicles, it would be wasteful and ineffective to target large-scale use of hydrogen in those sectors[[3]](#footnote-4). Moreover, even when targeting heavy-duty transport and industrial applications the hydrogen strategy should also look at the specific sub-sectors that would benefit from it most (e.g. steel) and make determinations on this basis.

Sincerely yours,



Bryan Purcell

VP Policy & Programs, The Atmospheric Fund

*The Atmospheric Fund (TAF) is a regional climate agency that invests in low-carbon solutions for the Greater Toronto and Hamilton Area (GTHA) and helps scale them up for broad implementation. Please note that the views expressed in this submission do not necessarily represent those of the City of Toronto or other GTHA stakeholders. We are experienced leaders and collaborate with stakeholders in the private, public and non-profit sectors who have ideas and opportunities for reducing carbon emissions. Supported by endowment funds, we advance the most promising concepts by investing, providing grants, influencing policies and running programs. We’re particularly interested in ideas that offer benefits in addition to carbon reduction such as improving people’s health, creating local jobs, boosting urban resiliency, and contributing to a fair society.*

1. We recommend reviewing this IRENA study for the challenges of ‘blue hydrogen’ that we feel is important but not part of this pre-consultation piece. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Sep/IRENA\_Hydrogen\_2019.pdf [↑](#footnote-ref-2)
2. For a general review of these applications, see this blog post from the Boston Consulting Group available at [www.bcg.com/publications/2019/real-promise-of-hydrogen](http://www.bcg.com/publications/2019/real-promise-of-hydrogen) . [↑](#footnote-ref-3)
3. For more information on the limitations on blending hydrogen into our Natural Gas supply we recommend this 2013 report from NREL - https://www.nrel.gov/docs/fy13osti/51995.pdf [↑](#footnote-ref-4)