

January 18, 2021

Michael Bishop
 Ministry of the Environment, Conservation and Parks
 Climate Change Programs and Partnerships Branch
 6th Flr, 135 St Clair Ave W, Toronto, ON M4V 1P5
hydrogen@ontario.ca

RE: Ontario Low-Carbon Hydrogen Strategy Discussion Paper

Dear Mr. Bishop,

Energy Storage Canada (ESC) is the national association for the energy storage industry in Canada. Our membership represents all players along the energy storage value chain – technology providers, project developers, investors and operators, utilities, electricity distribution companies and NGOs. We represent some of the largest energy companies in Canada as well as some of the smallest and most innovative clean-tech organizations.

ESC focuses on advancing opportunities and building the market for energy storage through advocacy, networking, and stakeholder education. Our mission is to advance the energy storage industry in Canada through collaboration, education, policy development and research. ESC takes an unbiased view with respect to the range of available storage technologies and is supported by the contributions of our active members.

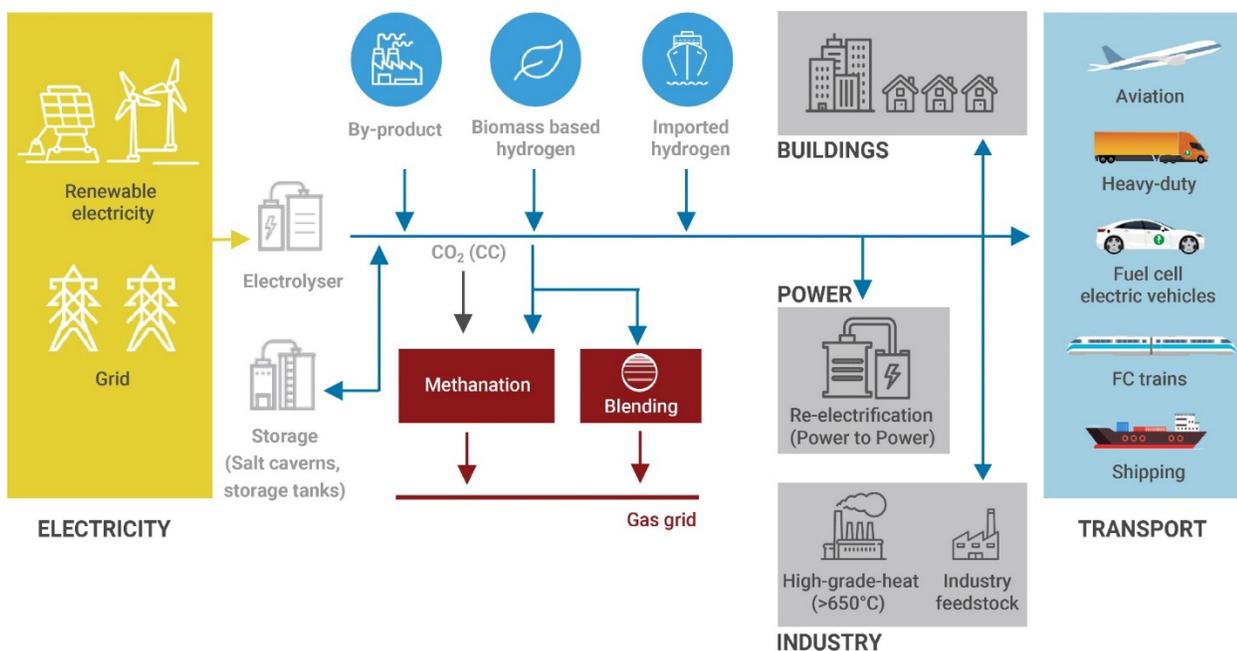


Figure 1. Role of storage in enabling end usage of hydrogen (Source: IRENA, 2018)

ESC is enthusiastic and supportive of Ontario's efforts to explore the role of hydrogen to support the reduction of greenhouse gas emissions, as well supporting clean tech industries and economic recovery from the COVID-19 pandemic. Storage is a key component of a hydrogen strategy, especially considering the make-up of Ontario's industry and electricity supply mix. As demonstrated by the International Renewable Energy Agency (IRENA), storage capacity of downstream sectors (i.e., gas infrastructure, hydrogen supply chain, etc.) can be used as a buffer to adjust hydrogen production and electricity consumption in real-time depending on the needs of the power system and other industries (see Figure 1).

In the following submission we directly respond to the discussion questions and emphasize the important role for storage in Ontario's hydrogen strategy.

ESC's responses to discussion questions

Vision

1. Do you support Ontario's efforts to create a hydrogen strategy?

Yes, ESC is very supportive of Ontario's efforts to create a hydrogen strategy.

2. How would you refine the vision statement?

ESC agrees with the vision statement outlined. If anything, we believe the government can achieve this vision while lowering costs for energy consumers and increasing the resiliency of the energy grid. Therefore, the vision statement could be amended as follows:

Leverage our existing strengths to develop Ontario's hydrogen economy, **reduce energy costs, increasing grid resiliency**, creating local jobs, and attracting investment while reducing greenhouse gas emissions.

3. What should be the key outcomes of Ontario's hydrogen strategy?

The key outcome of Ontario's hydrogen strategy should be the identification of key areas to invest and develop to enable the end-use of hydrogen, such as storage, and identifying the regulatory and market barriers that are preventing investment in hydrogen related infrastructure.

4. How should the hydrogen strategy define and measure success?

Success should be measured through the identification of key investments and removal of any regulatory or market barriers that would enable the achievement of the vision statement. This can be measured by the value of investments made, the number of jobs created, the expected energy cost reduction and the expected reduction in greenhouse gas emissions. ESC recommends that the hydrogen strategy develop clear targets for each success metric.

5. What are Ontario's key technology, regulatory and business opportunities in developing low-carbon hydrogen?

ESC encourages Ontario to explore the role that hydrogen storage may play in both the electricity and gas sectors. As outlined in our recent report *Unlocking Potential: An Economic Valuation of Energy Storage in Ontario*¹,

Ontario's supply mix often generates surplus energy in hours when demand is lowest, while requiring use of higher cost gas-fired generating units in peak demand hours. Time-shifting of energy output can reduce the long-term need for these resources as part of Ontario's overall supply mix. Less use of gas-fired generation will directly reduce carbon dioxide emissions and help Ontario meet its carbon dioxide emission reduction targets. In the process, energy storage will also reduce the amount of carbon tax paid in Ontario by electricity customers and provide a partial economic hedge against both future increases in carbon tax rates and potential increases in the cost of natural gas. (page 33)

ESC notes that Ontario's existing natural gas pipelines provides a key infrastructure and set of technologies to support the enablement of a hydrogen strategy by allowing for storage and transportation of hydrogen. To this end though, technology and perhaps business opportunities may exist around end-use technologies (i.e., furnaces, boilers, etc.) to ensure they are hydrogen ready, and then of course, deployed.

In short, hydrogen provides an excellent intertie between the electricity and natural gas systems in this province, thereby providing ways to optimize value.

6. What is the potential for hydrogen to contribute to Ontario's 2030 greenhouse gas emission reduction target?

We believe there is significant potential for hydrogen to contribute to meeting Ontario's greenhouse gas emission reduction targets. One way is through the blending of hydrogen into the natural gas stream, therefore seeing the direct reduction of greenhouse gas emissions by natural gas customers. Also, as demonstrated by the Independent Electricity System Operator's (IESO) most recent Annual Planning Outlook², Ontario has an emerging electricity system need. This need is anticipated to be met with greenhouse gas emitting natural gas peaking plants. More notably, Ontario has greater electricity system needs during the summer and in regional pockets (i.e., West of London), which indicates the potential role for hydrogen and notably storage solutions.

¹ Energy Storage Canada. 2020. *Unlocking Potential: An Economic Valuation of Energy Storage in Ontario*. Retrieved: <https://energystoragecanada.org/unlocking-potential>

² IESO. 2020. Annual Planning Outlook. Retrieved: <https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook>

7. What additional environmental benefits should be considered in the development of the strategy (for example during hydrogen production)?

ESC is supportive of exploring all potential environmental benefits. In the case of green hydrogen used to fuel bus, truck and commuter rail fleets, an important environmental benefit is the elimination of Critical Air Contaminants including NO_x, SO_x, and particulates from the diesel fuel displaced. Reduction of smog in urban centres will result in cleaner air and improved public health outcomes.

Generating economic development and jobs

8. What role can hydrogen play in various regions and sectors?

ESC is supportive of looking at all regions of the province. However, we note that certain areas of the province have emerging electricity needs and therefore it would be appropriate to consider co-benefits of hydrogen infrastructure investment, such as storage, in these regions. The IESO's recent Annual Planning Outlook clearly identifies these regions of Ontario's electricity grid.

Hydrogen can open up business opportunities around research, manufacturing, and deployment of supporting technologies and related end-uses compatible with hydrogen. In short, it could provide economic potential opportunity for Ontario.

9. What actions can Ontario take to help Ontario companies get ready to meet expected international demand (for example research and development, innovation, procurement)?

ESC has several members based in Ontario that design and build hydrogen technology including electrolysers and fuel cells, and who are actively developing opportunities for low-carbon hydrogen projects for injection into the natural gas grid, renewable natural gas, and fueling vehicles. Getting successful projects done in Ontario will help build the capacity to ramp up to exporting products and executing projects in other jurisdictions in Canada and internationally. Ontario needs to build off its early wins in this area.

10. What are the training needs for the workforce to support the economy across Ontario?

As the hydrogen infrastructure is built in Ontario the training needs for the workforce will include construction of Power-to-Gas plants, and hydrogen fueling stations as well as maintenance of this equipment. In Ontario, this includes getting TSSA certifications.

Promoting energy resilience

11. How can hydrogen support a reliable and affordable energy system, including energy storage?

ESC's recent report *Unlocking Potential: An Economic Valuation of Energy Storage in Ontario* indicates that the adoption of up to 1000 MW of energy storage can result in a net savings to

electricity customers of between \$774 million to \$2 billion in savings under a base case and a high estimate case, respectively.

While this report is storage technology agnostic, we report on the benefits and capabilities of the power-to-gas sector, notably:

Power-to-Gas is a flexible technology that uses the electrolysis of water to convert electrical energy into hydrogen. Power-to-Gas can be used to provide ancillary services such as rapid frequency response for electrical grid support, or utilized with a fuel cell to provide electrical power for operating reserve. The technology also enables the movement of energy from the electrical grid to the natural gas grid and back. The hydrogen produced from a Power-to-Gas process can also be blended into natural gas grids or combined with CO₂ to create renewable natural gas by methanation. (page 10)

12. What are the barriers and opportunities for hydrogen in the energy system?

ESC notes that given the emerging electricity system needs as outlined by the IESO in certain regions of Ontario. For example, the Windsor-Essex region, including the areas west of London, has an emerging electricity supply and infrastructure need, which could in part be met by storage. For example, the IESO has identified the potential need for up to 650 MW of generator or storage. This region may be particularly well suited for hydrogen storage given the existing gas and electricity infrastructure, as well as the existing industrial sectors. The barrier of achieving this opportunity is the need for development of a clear, transparent procurement process for resources. In this respect, ESC is supportive of the IESO's engagement to develop a new Resource Adequacy Framework³.

Reducing barriers and enabling action

13. How can the provincial government best support partnerships with the private sector, academia, and other government / levels of government?

No comment at this time.

14. Are you aware of regulatory barriers that need to be addressed or regulatory enabling mechanisms that need to be put in place? Please explain.

No comment at this time.

15. What are the best opportunities to cost-effectively support hydrogen across Ontario while respecting tax payers?

See response above. We calculate that the adoption of up to 1000 MW of energy storage can result in a net savings to electricity customers of between \$774 million to \$2 billion in savings under a base case and a high estimate case, respectively. Given Ontario's Comprehensive Electricity Plan,

³ IESO Resource Adequacy Engagement: <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Resource-Adequacy-Engagement>

which shifts the costs of electricity from the electricity rate base to the tax base, the savings in the electricity sector will support costs for tax payers as well.

Using hydrogen where and when it makes sense

16. What potential feedstocks and stages of the hydrogen supply chain (production, storage, and distribution, and end-use) do you think Ontario is best-positioned to develop and lead in and which uses have the greatest potential for cost reduction?

As demonstrated by this submission, ESC is supportive of developing storage, particularly as it can strategically create interties between the gas and electricity grids to support the reduction of electricity costs and increase grid resiliency in Ontario.

17. What are the main risks of hydrogen use in Ontario and are there opportunities for the government to decrease these risks?

Hydrogen infrastructure for the production, storage, and distribution of hydrogen for industrial customers has existed in Ontario for decades. As well, internationally recognized standards for the safe handling of hydrogen are in place. Ontario should work with other jurisdictions and industries to harmonize regulations and standards to ensure ease of development of hydrogen systems. As new low-carbon hydrogen facilities such as electrolyser plants to produce green hydrogen are added to the hydrogen eco-system in the province, effective training and compliance with hydrogen standards will ensure continued public safety.

18. Considering that low-carbon hydrogen is expected to be more competitive over time, what should be the timeframe for Ontario's hydrogen strategy?

The time to get ready for the hydrogen economy is now. Given the many benefits and opportunities it produces, including economic development, job creation, and environmental benefits, we encourage Ontario to develop and implement a low-carbon hydrogen strategy without delay. There are many barriers and issues that still need to be addressed, and as such, the timeframe for the hydrogen strategy is likely to evolve over this decade.

Conclusion

We are grateful for your consideration of our submission and we look forward to the next steps as Ontario develops and implements its hydrogen strategy. Please do not hesitate to reach out to me at anytime.

Sincerely,



Justin Rangooni
Executive Director