

Attachment 1: TRCA Submission on ERO#019-2709

Chief Executive Officer



January 18, 2021

BY E-MAIL ONLY (hydrogen@ontario.ca)

Mr. Michael Bishop
Ministry of Environment, Conservation and Parks
Climate Change Program Development
135 St. Clair Ave W
Toronto, ON M4V 1P5

Dear Mr. Bishop:

Re: Ontario Low-Carbon Hydrogen Strategy - discussion paper (ERO #019-2709)

Thank you for the opportunity to comment on the Ministry of Environment, Conservation and Parks' (MECP) Environmental Registry (ERO) posting on the Ontario Low-Carbon Hydrogen Strategy (the Hydrogen Strategy) discussion paper to help the ministry develop Ontario's first ever hydrogen strategy. Toronto and Region Conservation Authority (TRCA) commends the Ministry for taking on this important project and believes that the Strategy is a crucial step in helping Ontario achieve its climate mitigation goals as well as many other important sustainability outcomes.

TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures for plan review and permitting activities. TRCA is:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act* (EAA);
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under Section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, and as stated in "A Made-In-Ontario Environment Plan," TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources. TRCA is dedicated to managing the natural resources and risks to life and property from natural hazards for the municipalities we serve. Climate change poses a significant risk to the natural resources we manage and could significantly impact the risks to life and property from natural hazards. TRCA works closely with

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our municipal partners and other stakeholders to help mitigate and adapt to climate change in both new and existing developments and infrastructure.

At TRCA we strongly believe that as a society we can only achieve long-term environmental sustainability by addressing social and economic sustainability as synergistic requirements. To this end, we work with our municipal partners to incorporate environmental, social and economic considerations into our decisions and program delivery. For example, TRCA's [Partners in Project Green](#) (PPG) program is a collaborative initiative with municipal partners to engage the business community in environmental, social, and economic sustainability. Similarly, our Sustainable Neighbourhood Action Program ([SNAP](#)) is a place-based sustainability program, engaging neighbourhoods in tangible sustainability actions.

Government Proposal

We understand that MECP is seeking input on a discussion paper on the development of Ontario's first low-carbon hydrogen strategy, to better understand the needs of the sector, including consumers, better understand the challenges of supporting a complex hydrogen market, and consider ways to enable the private sector to expand adoption of hydrogen and support regional growth. The preliminary vision is to leverage existing strengths to develop Ontario's hydrogen economy, creating local jobs and attracting regional investment while reducing greenhouse gas emissions. This opportunity to comment is a pre-consultation, and the comments received will help inform the strategy. Some of the topics MECP is seeking feedback on include:

- The vision for Ontario's hydrogen strategy
- Supporting the Environment Plan by reducing greenhouse gas (GHG) emissions through low-carbon hydrogen
- Generating economic development and jobs by building a hydrogen industry involving all regions of Ontario to create jobs and facilitate economic recovery, seek strategic partnerships and support innovation
- Promoting energy resilience by considering the value of domestic hydrogen for Ontario's energy bills and evolving energy system
- Reducing barriers and enabling action in order to attract investment and create a level playing field between technology options
- Using hydrogen where and when it makes sense, focusing on areas that are most likely to become cost-effective.

General Comments

Overall, the discussion paper is excellent and provides good context for the development of the Hydrogen Strategy. Below are some strategic insights, comments, and recommendations for MECP's consideration, in addition to a detailed table of responses to the questions posed in the discussion paper (Table 1).

The context for the Hydrogen Strategy would be strengthened by addressing the need to achieve net-zero carbon emissions. The development of a Hydrogen Strategy is an important signal to business and investors that Ontario is serious about the hydrogen economy, however, the need for a hydrogen economy is driven by the need to achieve net-zero carbon emissions. The

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UNFCCC's Race To Zero initiative (<https://unfccc.int/climate-action/race-to-zero-campaign#eq-1>) has 120 countries and a wide variety of businesses, cities, regions, universities, committed to net-zero emissions. Together, these actors represent 25% of global emissions and 50% of global gross domestic product. If Ontario were to adopt a net-zero carbon goal, it would further strengthen the government's message concerning a low-carbon economy. Adopting this goal may also be beneficial to Ontario in attracting federal funding in support of low-carbon initiatives.

The discussion paper mentions "cost effective hydrogen" but we recommend that this requirement be strengthened. Canada has some of the least expensive hydrogen in the world that is created from natural gas. By addressing opportunities for carbon capture, utilization and storage (CCUS), Ontario, like Alberta, could produce "blue" hydrogen which is significantly more cost competitive but does not have as low a carbon footprint as "green" hydrogen. Blue hydrogen can help make the transition to green hydrogen more cost competitive and, at the same time, promote the carbontech sector – technologies that turn captured carbon into commercial products – and associated economic development, and help achieve shorter term GHG emissions targets (see the Pembina Institute paper on Carbontech, <https://www.pembina.org/pub/carbontech-innovation-system-canada>).

We recommend that the work of The Transition Accelerator (<https://transitionaccelerator.ca/>) be included to inform the Hydrogen Strategy. The Transition Accelerator is an organization working to accelerate the adoption of transformative technologies and approaches to reduce GHG emissions. Research papers available on The Transitional Accelerator website would be valuable assets in the development of Ontario's Hydrogen Strategy. This organization provided valuable input to the development of Canada's National Hydrogen Strategy and promotes a "node" based approach along with government, business, academic, and non-profit collaboration that would work well in Ontario. The National Hydrogen Strategy has adopted this approach (calling nodes "Hubs").

TRCA recommends that The Transition Accelerator approach to developing hydrogen nodes be utilized in Ontario. We recommend examining Bruce County, Sarnia, the Greater Toronto and Hamilton Area, Sudbury and Sault Ste. Marie as the key nodes for developing market demand for hydrogen, to eventually be linked by hydrogen pipeline in the medium term, and to Alberta and Quebec in the longer term. These nodes could also be "sandboxes" where new policies and approaches are piloted in advance of rolling them out across Ontario. TRCA suggests that the QUEST innovation-sandbox model (<https://questcanada.org/project/innovation-sandboxes-project/>) be reviewed as an approach that could help Ontario.

Finally, TRCA thanks MECP for choosing this path to a hydrogen-focused and low-carbon economy. As mentioned earlier, Ontario cannot achieve environmental sustainability without socio-economic sustainability. Our Partners in Project Green program, working in partnership with municipalities and the Greater Toronto Airport Authority, is currently engaged with thousands of businesses in the Greater Toronto Area on sustainability issues. We would be glad to meet with staff on the Hydrogen Strategy project to see how our programs can help MECP succeed in developing and implementing the Hydrogen Strategy.

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Table 1. TRCA responses to Ontario Low-Carbon Hydrogen Strategy Discussion Paper questions; our main recommendations are indicated in **bold**.

| DISCUSSION QUESTION | TRCA COMMENTS |
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| Vision | |
| 1. Do you support Ontario's efforts to create a hydrogen strategy? | Yes, moving toward sustainable low-carbon fuels is an important environmental and economic step for Ontario in achieving net-zero carbon emissions. |
| 2. How would you refine the vision statement? | Energy resilience is included in the principles but consider adding it to the vision. <i>Example:</i> Leverage our existing strengths to develop Ontario's hydrogen economy, creating local jobs and attracting investment while reducing greenhouse gas (GHG) emissions and increasing energy resilience. |
| 3. What should be the key outcomes of Ontario's hydrogen strategy? | The broader case for hydrogen has been made many times in a variety of documents. Drawing on what others have done, it is important that the Ontario Hydrogen Strategy lays out a framework and next steps for proceeding with action in Ontario. We highly recommend that MECP reviews the work of The Transition Accelerator and their approach to creating hydrogen nodes and collaborative action, or, as the national Strategy refers to them, Hydrogen Hubs. https://transitionaccelerator.ca/ |
| 4. How should the hydrogen strategy define and measure success? | There are several key performance measures that should be considered: <ul style="list-style-type: none"> • Level of hydrogen production in Ontario (energy content, weight or volume) for grey, blue and green hydrogen (and import if applicable) • Geographic distribution of hydrogen usage and how it is being used (industrial process, energy production, consumer use, and others) • Annual monetary investment in hydrogen infrastructure (by type: production, distribution, end use) • Annual monetary investment in hydrogen research and development • Annual GHG emissions reductions and carbon offsets created (carbon capture and storage may be applied to existing grey hydrogen production and capital expenditure funded through sale of offsets) |
| Reducing greenhouse gas emissions | |
| 5. What are Ontario's key technology, regulatory, and business opportunities in developing low-carbon hydrogen? | Consider linking the Hydrogen Strategy with helping Ontario get to net-zero carbon emissions. Linking with the broader goal allows the Hydrogen Strategy to be positioned as part of a broader low-carbon economy. This is important as many organizations may not yet see |

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| | <p>themselves as having a role to play in the hydrogen economy (even as an end user) but can envision participating in the low-carbon economy.</p> <p>It may also be important to address Carbontech (https://www.pembina.org/pub/carbontech-innovation-system-canada) as the carbon capture, utilization and storage (CCUS) sector is developing in Ontario and would complement the development of blue hydrogen and the cost-effective transition to green hydrogen.</p> |
| 6. What is the potential for hydrogen to contribute to Ontario's 2030 greenhouse gas emission reduction target? | <p>The breadth of potential uses suggests that it could play a very important role in achieving provincial GHG emissions targets.</p> <p>As technology and markets develop, hydrogen has the potential to play important roles in reducing emissions in the transportation sector (especially emissions from heavy-duty vehicles) and reducing grid emissions, as fuel in peaking plants and in improving grid power quality, and as a process fuel for industry (e.g., steel, cement, and many others). In the longer term as costs and distribution infrastructure increase, it can have an important role as a passenger vehicle fuel or for residential home heating.</p> <p>In the short term, Carbontech for carbon capture and storage to turn grey hydrogen into blue could generate significant GHG emissions reductions. TRCA is aware that the north shore of Lake Erie has some potential for carbon storage in deep oil and gas wells, which could support reducing GHG emissions from hydrogen production.</p> |
| 7. What additional environmental benefits should be considered in the development of the strategy (for example during hydrogen production)? | <p>Using hydrogen as a substitute for transportation fuels such as diesel can improve air quality, which is a major ecological, health, and environmental justice issue in urban and industrial areas.</p> <p>Analysis of environmental benefits could include quantifying the net anticipated reduction in GHG emissions of a fully implemented Hydrogen Strategy (accounting for life cycle analysis of hydrogen production and distribution, and GHG emissions offset through hydrogen use), and resulting reduced impacts on Ontario's environment of mitigating climate change.</p> |
| Generating economic development and jobs | |
| 8. What role can hydrogen play in various regions and sectors? AND 9. What actions can Ontario take to help Ontario companies get | <p>TRCA highly recommends looking at The Transition Accelerator and their node approach to building a hydrogen economy. There may be several important nodes in the province each of which have different technology, policy, and incentive requirements. Consulting with industry and leadership in each of these nodes to</p> |

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| ready to meet expected international demand (for example research and development, innovation, procurement)? | <p>develop an individualized road map would be critical for long term success. Key nodes could include Bruce County, Sarnia, GTA and Hamilton, Sudbury and Sault Ste. Marie.</p> <ul style="list-style-type: none"> • Bruce County requirements would center on using off-peak electricity to generate green hydrogen, and the need to connect with markets. • Sarnia's requirements might focus on CCUS to address GHG emissions from existing hydrogen production, and developing additional local demand for hydrogen. • GTA and Hamilton include a wide breadth of industries that could use hydrogen, including steel, cement, power, food and beverage and transportation, and thus a different set of policy, technology, and incentive requirements. • Sudbury requirements would need to address mining and associated industry characteristics. |
| Promoting energy resilience | |
| 11. How can hydrogen support a reliable and affordable energy system, including energy storage? | The key to an affordable energy system using hydrogen is to start with development of a low-cost blue hydrogen product and developing an associated market. As green hydrogen becomes more affordable outside of niche uses, the market can be transitioned to green hydrogen. |
| 12. What are the barriers and opportunities for hydrogen in the energy system? | TRCA highly recommends looking at The Transition Accelerator and their work on Alberta's hydrogen nodes. |
| 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? | The government can best support these partnerships by applying the hydrogen node approach and developing working groups for each node that includes, government, business and NGOs to guide and participate in action. TRCA currently has a collaborative program in the GTA in partnership with the Greater Toronto Airport Authority (Partners in Project Green) that is developing the largest eco-business zone in North America. The program engages with key government and business organizations and could be used to facilitate the development of a GTA and Hamilton Hydrogen Node. We would be pleased to meet with MECP staff to explore this opportunity. |
| 15. What are the best opportunities to cost-effectively | Generating low-cost blue hydrogen and associated markets is likely the most effective approach to initiating a hydrogen market in Ontario. Discussions with existing hydrogen production facilities |

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| support hydrogen across Ontario while respecting tax payers? | <p>and organizations in the Carbontech sector and academia would be key to initiating this opportunity. This is likely the best approach to initiate larger market demand for hydrogen.</p> <p>Green hydrogen will have small niche markets where it makes sense to pay \$3 to \$5 per kilogram of hydrogen. These markets are worth pursuing but are unlikely to be the path to a broader hydrogen market in the short or medium term. One example of a niche market is the work the National Renewable Energy Laboratory (NREL) in the United States is conducting with electrolyzers for hydrogen production as a tool to improve electrical grid power quality. Electrolyzers can be used to strategically to improve power quality, which generates value for the grid; the by-product is hydrogen production. This hydrogen can be sold to market or used in a fuel cell to further stabilize the electrical grid.</p> |
| 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? | <p>Please see previous answer (#15) on blue hydrogen.</p> <p>TRCA emphasizes the imperative to build on existing markets for hydrogen (production and use), as this will undoubtedly be the best low-cost path to a broader hydrogen market. This approach will help create the needed hydrogen infrastructure to eventually support the many diverse end-use hydrogen technologies that are only viable once hydrogen infrastructure is in place. This approach will also enhance Ontario's growth in the Carbontech sector (associated with CCUS).</p> <p>In terms of other feedstocks, TRCA recommends creating a hierarchy for hydrogen sources to prioritize. Similar to waste management, priority could be given to hydrogen sources from food and organic waste and forestry waste over standing forest biomass. Further, if forest biomass is utilized, it will be important to examine life cycle carbon emissions, impacts on ecological services, and overall sustainability of utilizing standing or downed forest biomass, and impose conditions to ensure long-term sustainability and net GHG emissions reductions.</p> |
| 17. What are the main risks of hydrogen use in Ontario and are there opportunities for the government to decrease these risks? | <p>A major risk of hydrogen use is safety as with any other gaseous fuel source. Hydrogen is highly flammable and is colourless and odorless, requiring specialized systems to detect and prevent leaks. The government can reduce such risks by establishing stringent safety standards for the production, storage and distribution and end-use of hydrogen.</p> |

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| 18. Considering that low-carbon hydrogen is expected to be more competitive over time, what should be the timeframe for Ontario's hydrogen strategy? | <p>The overall strategy should look out 10 years in detail and 20 years at a high level. The time frames may differ between the different nodes, if the nodes approach is employed by MECP.</p> <p>TRCA also suggests that MECP incorporate the QUEST innovation – sandbox approach (https://questcanada.org/project/innovation-sandboxes-project/) as a way to test programs, policies, and incentives before rolling them out more broadly in the province. This approach might also help accelerate hydrogen market development.</p> |

Thank you once again for the opportunity to provide comments on the Ontario Low-Carbon Hydrogen Strategy discussion paper. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

<Original Signed by>

John MacKenzie, M.Sc.(PI) MCIP, RPP
Chief Executive Officer

BY E-MAIL

cc:

TRCA: Laurie Nelson, Director, Policy Planning
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