

January 18, 2021

Michael Bishop
Climate Change Program Development
Ministry of Environment, Conservation and Parks
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RE: Ontario Low-Carbon Hydrogen Strategy – Discussion Paper (ERO Number: 019-2709)

Dear Mr. Bishop,

The Canadian Steel Producers Association (CSPA) is the national voice of Canada's \$15 billion steel industry. Our member companies annually produce approximately 13 million tonnes of primary steel as well as over 1 million tonnes of steel pipe and tube products in facilities located across Canada. Domestic steel operations directly employ some 23,000 Canadians while supporting an additional 100,000 indirect jobs. Canadian steel producers are a critical component of Canada's economy and industrial base, serving the needs of North American customers with high quality, competitive, and innovative products. Key market segments for member companies include automotive; energy discovery, extraction, and transport; major infrastructure projects; commercial/residential construction; renewable energy creation; and many general manufacturing applications. CSPA is committed to fostering a strong and sustainable future for Canada's vital steel producers and enabling our members to prosper in both domestic and international markets.

Early in 2020, the Canadian steel industry put forward a new [climate vision](#) for our sector – an industry first – with the aspiration of achieving net zero carbon dioxide emissions by 2050. This long-term plan outlines a significant opportunity for our industry, through partnership with likeminded stakeholders including government, to reduce carbon emissions and find practical solutions that will ensure steel is made in Canada for generations to come.

Based on current research, the steel sector believes that hydrogen and electrification can play an important and integrated role in the overall strategy for decarbonization in the province. Hydrogen also supports electrification by providing grid scale storage and balancing for intermittent energy resources. The government is to be commended for undertaking this work and this consultation.

The vision of the Ontario Hydrogen Strategy is to: “Leverage our existing strengths to develop Ontario’s hydrogen economy, creating local jobs and attracting investment while reducing greenhouse gas emissions”. This is a good initial vision statement for a new energy sector that will span virtually all carbon intensive sectors of Ontario. However, we would encourage consideration be given to specifically noting a commitment to protecting and preserving the thousands of high-quality jobs supported by Ontario’s existing industrial and manufacturing sectors. It is important that the government continues to work with energy-intensive trade-exposed (EITE) industries, including steel, to find viable and effective ways to reduce GHG emissions while maintaining industry’s competitiveness. The development of a strategy that does not support the long-term environmental *and* economic sustainability of our industry would be contrary to the strategy vision and have a catastrophic impact on our operating communities and the broader economy.

There is a significant opportunity for hydrogen in Ontario, but it will be a massive undertaking. Collaboration is required across all levels of government, between sectors, within sectors, and even between direct competitors to ensure a sustainable transition. Laying the groundwork now and promoting the growth of hydrogen supply can ready the infrastructure needed for companies to pursue hydrogen technology as an option supporting the transition towards net zero steelmaking. This discussion paper is a good start for Ontario.

Your consideration of these comments is valued. The Ontario steel sector wishes to remain engaged through the process of developing the provincial hydrogen strategy.

Sincerely,



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Ontario Discussion Paper Questions & CSPA (Ontario) Responses

Vision

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

Yes, the Ontario steel sector supports the province's efforts to create a hydrogen strategy. The sector believes that hydrogen will be an important part of an overall strategy for decarbonization in the province.

Ironmaking and steelmaking processes are difficult to decarbonize. Based on current research, the steel sector believes that hydrogen, carbon capture, use and storage (CCUS), bioenergy and direct electrification are all technologies that will be needed to achieve deep emissions reductions in the steel sector. Provincial support of hydrogen technologies is imperative to ensure a future supply of low-carbon, low-cost hydrogen and the supporting infrastructure required to access this hydrogen. It is critical that the provincial and federal governments work together to ensure that the provincial and federal hydrogen strategies are harmonized and work together to achieve environmentally and economically sustainable outcomes.

2. How would you refine the vision statement?

The vision statement is well-written and supports progressive thoughts on how a hydrogen strategy should be rolled out.

We would encourage consideration be given to specifically noting a commitment to protecting and preserving the thousands of high-quality jobs supported by Ontario's existing industrial and manufacturing sectors. Sacrificing existing jobs that could rely on future hydrogen developments would be counter-intuitive and in our view contrary to the overall vision for the strategy.

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

By 2050, the key outcome of Ontario's hydrogen strategy should be the creation of a sustainable hydrogen network available for industrial, commercial, residential and transportation applications across the province, without sacrificing the economic value and strength created by Ontario's existing manufacturing sector. This will require high volumes of low-carbon, low-cost hydrogen. In the shorter term, regional centers or hydrogen hubs are more sustainable as a means of building up a self-sustaining marketplace for low-cost hydrogen by keeping infrastructure costs at a low level. Over time the network can expand to meet increasing demand. Initial availability (and investments) should target major transportation corridors and existing industrial centers.

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

Potential measures of success:

1. Canada is a leader in hydrogen production technology, generating the lowest cost emission-free hydrogen
2. Canada is exporting this technology to other countries
3. Canada's EITE customers have reliable access to globally competitive hydrogen supply and cost
4. Canada's EITE sector is thriving due to its competitive cost advantage due to its low-cost low-carbon energy supply and government support for R&D, piloting, commercialization and capital renewal during the transition.

These factors should be considered in an integrated manner; not separately.

Reducing Greenhouse Gas Emissions

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

Matching surplus grid electricity with electrolyzers to produce low-carbon hydrogen is an opportunity for Ontario.

The steel sector supports low-cost non-emitting electricity generation. There is the possibility that small modular reactors could be a cost-effective route to producing energy and could also be located close to the need to avoid transmission lines or congestion on existing lines.

As well as the steel sector's current important role in supplying the province's valued manufacturing supply chain (including the automotive sector), steel will be an important part of the economy's overall energy transition (e.g. for use in solar panels, wind turbines, electric vehicles, etc.).

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

There will be a relatively modest potential for hydrogen to contribute to GHG reductions in the steel sector prior to 2030. Hydrogen may be blended into the natural gas supply. Hydrogen may be used to a limited degree in existing blast furnaces if there are substantial technological advances in the near term.

According to the International Energy Agency, “in the medium to long term, carbon capture utilization and storage (CCUS) and fuel shifts – away from coal towards natural gas, hydrogen and bioenergy- play a larger role” to make progress on global steel industry climate goals¹. The most significant potential opportunities for the use of hydrogen in the sector will be post-2030 but will require public-private partnership in the development of ground-breaking, commercially viable technology. For example, there is the potential to use hydrogen as a feedstock to reduce iron ore (iron oxide) to produce direct reduced iron (DRI). Currently this process can be done with natural gas as an alternative to blast furnace ironmaking. This massive technological shift would likely take place in stages with natural gas DRI being adopted initially (supported by CCUS), followed by hydrogen DRI once the process is better understood and the cost competitiveness of hydrogen improves. A noted barrier to these developments is the vast supply of electricity that will be required for such technologies, including electrolytic hydrogen production.

Note that **the paths to decarbonizing the steel sector will vary by facility** and is dependent on many factors, including emerging research in the coming years. Another possible future method to produce iron is by electrolysis.

If the five key conditions for success identified in CSPA's [Call to Action](#) are achieved, and as iron and steelmaking technology evolves and if a stable and abundant hydrogen market develops, then there will be greater confidence for Canada's steelmakers to make investments in the 2030-2050 timeframe to adopt hydrogen-based technologies.

¹ International Energy Agency, Iron and Steel Technology Roadmap: Towards more sustainable steelmaking, 2020.

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

The potential for environmental co-benefits such as reductions in other air quality parameters, should also be considered in the development of the provincial strategy.

There are potential benefits in the circular economy. Electric arc furnace (EAF) steel can be produced using scrap steel. A by-product of processing scrap is auto shredder residue (ASR) which is essentially plastics. There is an opportunity to use ASR to produce a syngas. There is also opportunity to use the forestry biomass that is available in northern Ontario.

Generating Economic Development & Jobs

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

A responsible strategy that balances environmental and economic sustainability could result in the supply of low-cost, low-carbon hydrogen that could help to play a role in keeping steel industry jobs in Ontario. The region risks being exposed to significant job loss from carbon pricing in the future if carbon pricing is not adopted in competing jurisdictions, or if governments do not impose some form of equalization measure at our borders. However, a poorly designed hydrogen strategy that does not consider the economic value of the manufacturing sector in Ontario and the thousands of middle-class jobs it support could be equally as catastrophic for our industry, our customers and the entire supply chain.

Utilizing hydrogen in steelmaking is one of multiple pathways to produce steel with less carbon emissions. In turn, these 'greener' steel can produce sustainable solutions for our society in a broad spectrum of Ontario's economy including automotive, energy, infrastructure, and construction.

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

Supporting the aspirational goal of transitioning the steel sector towards net-zero will require significant investment. Ontario must support domestically competitive steelmaking, which requires a consistent supply of low and zero-carbon energy (including natural gas, hydrogen and electricity) at low prices. Future competitiveness requires support from all levels of government to ensure steel producers are on a level playing field with respect to carbon pricing.

The Canadian steel sector has worked with the Canadian Carbonization Research Association (CCRA) to outline the [R&D work](#) that needs to take place to support decarbonization in the sector.

Canadian steel has a greenhouse gas emission profile that is significantly less than foreign steel shipped to Canada from overseas. Canada should follow the lead of California and Europe by implementing green public procurement policies for construction materials that help to establish a level playing field for Canadian businesses. Additionally, Ontario must work in collaboration with the federal government to ensure that EITE industries are not unfairly exposed to artificially low-priced imports from countries that do not share similar carbon pricing mechanisms. The steel sector recommends that the province give strong consideration to establishing procurement and infrastructure spending priorities and policies that recognize the economic, social and climate benefits of using Canadian steel in domestic infrastructure projects. The Canadian steel industry will need to invest significantly to support the transition to net-zero. The Ontario government's support for capital renewal through direct investment and tax incentives will be required to retain global competitiveness.

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

A technically advanced workforce is required to support hydrogen steelmaking. Investment in the trades, namely pipefitters, will be required to ensure adequate knowledge on hydrogen piping standards and practices is available. Hydrogen piping standards already exist, but ensuring enough tradespeople are being trained to meet industrial demand can be incentivized by the Ontario government.

Promoting Energy Resilience

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

Hydrogen could facilitate energy storage and balancing for renewable resources. Developing cost effective storage should be part of the strategy. Advanced Small Modular Reactors (SMRs) could be utilized to generate hydrogen with negligible transmission costs if deployed near major demand sources for hydrogen (such as steel companies). Implementation of such technology needs to be cost-competitive for Ontario's steel producers, given the high trade exposure of the global steel industry. Increasing costs born by Ontario's EITE sectors must be considered in the development of equalization measures at our borders to ensure that producers from jurisdictions that

do not share a similar commitment to environmental sustainability do not benefit from a cost advantage in our market resulting from their unwillingness – or inability – to act.

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

The barriers related to hydrogen use in the steel sector are technological as well as cost and availability. The production of green hydrogen will require large quantities of non-emitting energy. While electrolysis is one path, other processes to produce hydrogen should be explored to determine which path provides lowest cost.

Reducing Barriers & Enabling Action

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

The government must ensure technological readiness for existing equipment/facilities to utilize hydrogen. It is recommended that funding support be made available to assist businesses with investigating the technological transformations that will be required to maximize the use of hydrogen in their specific facilities and to help implement any upgrade or transformation.

It is recommended that hydrogen steelmaking and ironmaking research be supported. For example, CSPA continues to work collaboratively with CCRA to develop a low-carbon [R&D roadmap](#) for Canada's steel industry. Additional stakeholder engagement and support, such as the Ontario government, would help further support the short and longer-term R&D efforts for low-carbon steel in Canada.

It is also recommended that Ontario fund a demonstration facility for hydrogen ironmaking competitive with other jurisdictions (like Hamburg, Germany). Such an endeavour would involve various levels of R&D: industrial, academic, and government research facilities. The output would drive future full-scale hydrogen investment.

There is also the opportunity to develop alternate sources of hydrogen such as from plastics/biomass. There will be different regional opportunities and these should be part of the overall plan. For example, pyrolysis and plasma gasification processes exist today that take plastic waste including auto shredder residue (ASR) and produce a syngas that contains hydrogen, methane and carbon monoxide. There is opportunity around the forestry biomass that is available in northern Ontario.

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.

We are not currently aware of specific regulatory barriers.

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

Significant initial *public* investment is required to initiate the manufacturing transformation. Over time, economies of scale must take over to ensure a stable marketplace for hydrogen that is independent of public support. “Cost-effectiveness” of investments can be measured on a cost per tonne of GHG avoided basis. There is an opportunity to build on the leadership position that Canada already has in this space.

Using Hydrogen Where & 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?

Hydrogen produced with nuclear energy offers a low-carbon, long term supply solution for hydrogen in the province. Ontario’s natural resources like fresh water will be critical for green hydrogen electrolyzers.

The Dawn Hub facility and surrounding area may offer a complementary source of hydrogen from natural gas in southern Ontario.

The use of organics/plastics and forestry biomass are other paths worth developing. Local production is likely the best place on which to focus development as it avoids power transmission and distribution of hydrogen.

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

The major risk is the economic viability of transitioning away from low-cost carbon to higher priced hydrogen, or other higher priced carbon reduction technologies. Manufacturers will need to remain competitive with both domestic and international competitors who may not be exposed to the same costs, which will impact competitiveness. Concepts like green border adjustments to prevent carbon leaks across borders must be considered, within the framework of various trade agreements.

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

Ontario's hydrogen strategy, similar to the federal strategy, should consider the short, medium and long-term (to 2050).

The steel sector has a very long planning horizon. Decisions about major investments are made 5 to 10 years in advance. Significant consumption of hydrogen is not expected until at least the 2030-2050 timeframe. Improved confidence in the technology, as well as supply availability and cost, will be needed to move forward with a hydrogen strategy in the sector.