January 16, 2021

RE: CHAR Technologies Comment on Ontario Low-Carbon Hydrogen Strategy – Discussion Paper

CHAR Technologies would like to applaud the vision of the Province of Ontario in developing Ontario's first ever hydrogen strategy. CHAR sees a significant amount of potential and opportunity in the development of a hydrogen economy in the Province, and hope to participate in future consultations.

Biomass to Hydrogen Production:

In the realm of hydrogen production, we want to ensure that the Province is inclusive of all forms of green hydrogen production from biomass. The technology identified in the discussion paper is gasification. There are two other forms of biomass to hydrogen technologies that are commercially available and being developed in Ontario. For simplicity, we will include a description of all three:

1. Biomass Gasification: As described in the discussion paper, "[b]iomass gasification uses a controlled process involving heat, steam and oxygen to convert biomass to hydrogen and other products, without combustion.

2. Biomass Pyrolysis: While similar to gasification in that it is a controlled process involving heat to convert biomass to hydrogen and other products without combustion, a pyrolysis system does not use steam or oxygen, and is kept oxygen free. There are advantages and disadvantages to gasification and pyrolysis, and each will be needed as the Province proceeds with a hydrogen strategy, but we want to ensure both types of thermal processes are identified and included.

3. Biogas to Hydrogen: While identified in the Regional Opportunities section on page 11 with respect to landfill gas to hydrogen, biogas to hydrogen is similarly a biomass to hydrogen technology type that is not included in the general description of green hydrogen. This process involves the generation of biogas from organic waste streams (like green bin waste), and further steam reforming that biogas into hydrogen – similar to grey hydrogen. However since it is using biogas, which is generated from various biomass materials, we feel it should also be included in green hydrogen, biomass to hydrogen, section.

Opportunities for Rapid Development of Hydrogen Production

CHAR suggests that one of the most important aspects of the hydrogen strategy is to continue to promote made-in-Ontario hydrogen production technologies. While important to promote all aspects of an overall hydrogen economy, if the use aspects are promoted before the technology production is deployed, there is a risk to made-in-Ontario technologies.

Therefore, CHAR suggests that in order to allow for rapid deployment of made-in-Ontario technologies, the Province should develop a framework to promote the near-term deployment of hydrogen

generation technologies in the Province. CHAR suggests that a target or mandate of minimum hydrogen content in the Ontario natural gas distribution system will be an efficient way to promote hydrogen generation in the Province.

Similar to many jurisdictional targets for renewable natural gas, this will allow hydrogen generation companies to have a bankable market opportunity, further allowing them to then take on the process and production risk, while reducing any real or perceived risk to end users. With a target or mandate, the hydrogen generated would be required to meet a purity requirement to inject in the grid, and the firm would be paid for hydrogen injected into the grid. However, if there were any technical issues in the production of hydrogen, the company would themselves bear the financial consequences, while end users would not be affected. As identified in the plan, this could be promoted in all parts of the Province based on local opportunities (sustainable forest biomass to hydrogen into the TransCanada pipeline in the North, electrolysis in Bruce County, etc).

Having an install base of multiple operating, commercial, hydrogen generation systems will be a critical aspect to allow for competitive bidding by made-in-Ontario hydrogen generation firms for the other medium- and longer-term opportunities identified in the plan. Without an install base and without commercial operational history, developing made-in-Ontario hydrogen generation technologies will be overlooked and/or disqualified from many procurement processes for the end uses identified in the plan, including hydrogen for refinery use in Sarnia, and the potential to supply hydrogen to a GO rail fleet hydrogen strategy.

Speed

CHAR believes that the Province of Ontario is well positioned to be a leader in hydrogen, from generation to use. However, other jurisdictions are rapidly deploying hydrogen plans of their own. For example, in the Province of Québec, Xebec, based in Montreal, recently announced the acquisition of a European hydrogen developer, “HyGear.” Similarly, Enerkem, another Québec-based firm recently announced the $875 million Varennes Carbon Recycling (VCR) plant, with a 40% interest by Shell, to produce hydrogen, among other biofuels and biochemicals.

The Province of Ontario has key competitive advantages in the production and use of hydrogen, but must act quickly to ensure leadership in this area.

CHAR is enthusiastic about the future of hydrogen in the Province of Ontario, and would again like to congratulate the Province on this important first step in developing the Ontario Low-Carbon Hydrogen Strategy. We would be happy to continue to participate in consultations.

Sincerely,

Andrew White
CEO
CHAR Technologies Ltd
(647) 968-5347
andrew.white@CHARtechnologies.com