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**RE: Alberta’s Hydrogen Roadmap**

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.

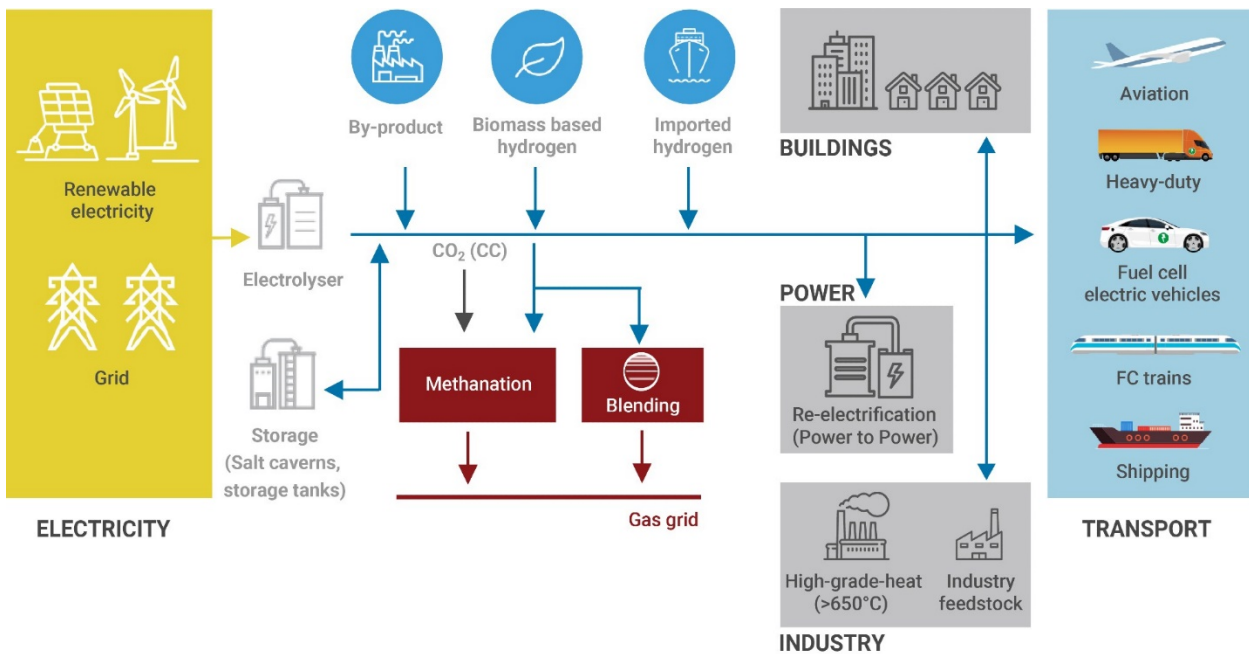


Figure 1. Role of storage in enabling end usage of hydrogen (Source: IRENA, 2018)

ESC is enthusiastic and supportive of Alberta’s efforts to explore the role of hydrogen in the economy. Storage is a key component of a hydrogen roadmap and strategy, especially considering

the make-up of Alberta's industry and evolving electricity supply mix. As demonstrated by the International Renewable Energy Agency (IRENA), storage capacity of down stream 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).

The following submission addresses the specific questions posed:

**1. What do you consider are the greatest opportunities that Alberta has in pursuing and expanding the hydrogen economy?**

ESC encourages Alberta to explore the role that hydrogen storage may play in both the electricity and gas sectors. Alberta'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.

Hydrogen can open up business opportunities around research, manufacturing, and deployment of supporting technologies and related end-uses compatible with hydrogen. In short, hydrogen provides a significant economic opportunity for Alberta.

**2. What potential concerns do you have for Alberta pursuing hydrogen development?**

No concerns at this time; we support the development of a hydrogen roadmap.

ESC has several members 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 and fueling vehicles. Getting successful projects done in Alberta will help build the capacity to ramp up to exporting products and executing projects in other jurisdictions in Canada and internationally. Alberta needs to build off its early wins in this area.

**3. What are the greatest gaps and barriers for Alberta to pursue hydrogen development? What are the most important to solve?**

One key outcome of Alberta's hydrogen roadmap 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. What are the first steps Alberta should take to advance the hydrogen economy?**

Expanding the demand for hydrogen through customer adoption is a key first step. Overtime, customer confidence in hydrogen fuel and technologies will enable broader transitions. The government could support this in several ways, including:

- Pilots to blend hydrogen gas into natural gas supply
- Support programs (e.g., grants/incentives) to adopt hydrogen fuel in commercial and industrial operations (i.e., forklifts, other transportation, etc.)
- Government led procurements for use of hydrogen within its own operation (e.g., hydrogen transportation fleets, hydrogen fuel requirement)

**5. What do you consider to be required for hydrogen deployment to occur by 2030 in heating, power generation, transportation, industrial feedstock and chemicals, and exports?**

Hydrogen infrastructure for the production, storage, and distribution of hydrogen for industrial customers has existed in Alberta for decades. As the hydrogen infrastructure is built in Alberta 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 Alberta, this includes getting TSSA certifications.

As well, internationally recognized standards for the safe handling of hydrogen are in place. Alberta 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 hydrogen are added to the hydrogen eco-system in the province, effective training and compliance with hydrogen standards will ensure continued public safety.

**6. What enabling conditions need to be added or put in place? For example, enabling conditions may be considered for Markets and Infrastructure, Regulations, Technology, Societal and Public Perspectives, and the Environment (land, water, etc.)**

As referenced above, enabling conditions should focus on the adoption and deployment of hydrogen technologies and fuels. We recommend consulting on the development of plans for hub in Alberta for energy storage. In addition to transportation of storage, this should include storage of hydrogen and delivery to end-use customers.

**7. What impediments (policies, regulations, or other) must be resolved in order to advance hydrogen deployment in Alberta?**

With respect to power-to-gas applications, we encourage Alberta to consider potential cost constraints related to the current or future electricity tariffs. For example, the implications to project economics related to electricity demand charges that are non-coincident peak or other fixed charges.

## **Conclusion**

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

Sincerely,

A handwritten signature in black ink that reads "Justin W Rangooni". The signature is written in a cursive style with a large initial 'J' and 'R'.

Justin Rangooni  
Executive Director