Alberta's Opportunity in the Hydrogen Economy

Issue

Hydrogen's potential has been identified as an important part in the global transition to emissions-free fuel sources and a healthier planet. The right support and promotion will enable Alberta to become a leading blue hydrogen supplier serving the global market. This environment will allow R&D and production to thrive, and allow government to keep keeping regulations and public funding to a minimum.

Background

It is no secret that economic diversification has been on the minds of the Canadian and Alberta governments for some time. The harsh economic impacts of the global pandemic and recession creates many questions about how to rebuild stronger for the future. We know, and support, that our traditional energy sector will be required for years to come, while at the same time we know that we must broaden our economic base and work towards more sustainable energy solutions. Hydrogen, while considered for years, may just be a perfect fit for the times.

Hydrogen is the most abundant element in our universe, made of one proton and one electron. While hydrogen burns cleanly with zero carbon emissions, there are three types of hydrogen,[1] each defined by the carbon output resulting from its production. "Grey" hydrogen, currently the most common, is produced from natural gas and emits carbon. "Blue" hydrogen, still created from natural gas, reduces GHG concerns as the emitted carbon is stored underground in a process called Carbon Capture, Utilization and Sequestration (CCUS), or used for other purposes. The final type is "green" hydrogen, powered by electrolysis, and is truly "emissions-free" but faces cost-efficiency challenges. Alberta's Natural Gas Strategy,[2] that was released in Fall of 2020, has positioned Alberta to be a leading producer in blue hydrogen.

At the consumer level, hydrogen can be used to reduce emissions as a clean-burning transportation fuel, or for heating homes. In 2020, Canadian Utilities (a member of the ACTO group of companies) announced that around 5000 homes in Fort Saskatchewan, Alberta, would be heated with a natural gas-hydrogen blend starting in 2021, in the country's biggest hydrogen-blending initiative.[1] Hydrogen can also be used as an industrial feedstock in places like Alberta's Industrial Heartland.

At the national level, hydrogen will be an important ingredient in the move towards net-zero emissions targets. In Canada, the Transition Accelerator, a think-tank studying a hydrogen transition, views hydrogen as a part of Canada's net zero target, for instance, as a possible key input in an overhauled electricity grid.[3] The Federal government is supportive of hydrogen by recently releasing its federal

[1] https://www.cbc.ca/news/canada/calgary/alberta-hydrogen-home-heating-1.5657736
[2] https://www.alberta.ca/natural-gas-vision-and-strategy.aspx
[3] https://transitionaccelerator.ca/wp-content/uploads/2021/01/2021-01-24-Pathways-to-Net-Zero-v9-4.pdf

hydrogen strategy.[4] Canada joins a list of countries that are investing in hydrogen, including: Australia, Germany, South Korea, Saudi Arabia, and more.[5]

The hydrogen economy, however, is not without challenges. A key challenge lies in the finalization of commercial-level CCUS technology. ATCO, a major player in Alberta's hydrogen space, has stated that they still have to "crack the carbon capture nut on a commercial level" predicting they are still approximately 5-6 years away from "commercial hydrogen production".[6] However, Alberta is in a great position to meet this challenge. The Alberta Carbon Trunk Line (ACTL) is a large-scale CCUS pipeline that is already in place that begins in Alberta's Industrial Heartland and "captures industrial emissions and delivers the CO_2 to mature oil and gas reservoirs for use in enhanced oil recovery and permanent storage… ACTL is capable of transporting up to 14.6 million tonnes of CO_2 per year… equal to the impact of capturing the CO_2 from more than 3 million cars in Alberta."[7] Further to this, Alberta's recently released Natural Gas Strategy[8] has set a 2030 goal for "Large-scale hydrogen production with carbon capture, utilization and storage (CCUS) and deployment in various commercial applications across the provincial economy".

A Transition Accelerator report[9] notes that one of the greatest challenges with building out the hydrogen economy is "connecting hydrogen supply to demand". The report notes that the Alberta Industrial Heartland region is well positioned to reach demand with "the ability to produce a large amount of low-cost, blue hydrogen adjacent to corridors with substantial demand for the gas as a transportation or heating fuel". "With sufficient demand for hydrogen in the corridor, pipeline infrastructure can be justified, and the new energy system will become economically viable in the absence of ongoing public investment."

Beyond domestic industrial and commercial uses, Alberta has set a 2040 target to ensure "exports of clean hydrogen and hydrogen-derived products" can be delivered "to jurisdictions across Canada, North America, and globally".[10]

With its existing infrastructure, access to feedstock, and export market knowledge, Alberta holds a great opportunity in the hydrogen energy sector. With continued provincial and federal support for blue hydrogen, and with successful R&D in carbon capture technology, Alberta holds potential as a leader in the emerging Hydrogen economy.

The Alberta Chambers of Commerce recommends the Government of Alberta:

1. Support blue hydrogen research and production in Alberta by working with stakeholders, such as the federal government and the energy industry in a manner consistent with the federal hydrogen strategy;

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[4] https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/environment/hydrogen/NRCan_Hydrogen-Strategy-Canada-na-en-v3.pdf
[5] https://sponsored.bloomberg.com/immersive/hyundai/the-h2-economy
[6] https://edmontonjournal.com/news/politics/alberta-natural-gas-strategy
[7] https://actl.ca/
[8] https://www.alberta.ca/natural-gas-vision-and-strategy.aspx
[9] https://transitionaccelerator.ca/wp-content/uploads/2020/11/Building-a-Transition-Pathway-to-a-Vibrant-Hydrogen-Economy-in-the-Alberta-Industrial-Heartland-November-2020-5.pdf
[10] https://www.alberta.ca/natural-gas-vision-and-strategy.aspx

2. Work with industry to assist in research and infrastructure needs for Carbon Capture, Utilization and Storage to accommodate blue hydrogen energy;
3. Based on the results of a true market assessment of hydrogen energy viability, develop a plan that creates pathways for hydrogen to succeed on merit, with minimal use of regulation or policy; and
4. Work with the federal government to identify potential international markets to export hydrogen technology and product.