The business of B.C.’s hydrogen strategy

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British Columbia recently released its B.C. Hydrogen Strategy (the Strategy), making it the first province in Canada to provide a comprehensive framework for how it will transition to renewable and low-carbon hydrogen as a means of sustainable energy.

Falling under the scope of CleanBC, the Strategy addresses 63 wide-ranging action items for government, industry, and clean-technology innovators to undertake on a five-year, incremental basis. Low-carbon hydrogen represents a promising alternative energy, with zero greenhouse gas (GHG) emissions at consumption.

In light of B.C.’s growing clean-tech industry and commitment to developing its hydrogen economy, rather than merely review the Strategy, we present below a look at some of the significant business opportunities that may arise from it.

What you need to know

- The B.C. government intends to promote hydrogen production at-scale to meet domestic and/or international demand by 2025-2030. There is a significant need for essential large-scale electrolyzers (*i.e.*, electrolyzer plants) to be manufactured and capable of producing green hydrogen in a cost-effective manner.
- CleanBC proposes that 15 per cent of natural gas consumption must be supplied by renewable gas by 2030. There is an opportunity for midstream natural gas companies and producers of hydrogen to leverage “Power-to-Gas” (P2G) technology as a means of injecting hydrogen into existing facilities. However, this requires that the necessary storage and distribution infrastructure be in place.
- The vast majority of remote communities in B.C. generate heat and power by way of diesel-powered generators, which results in significant GHG emissions. CleanBC aims to reduce diesel generation of electricity by 80 per cent by 2030. To meet this target, hydrogen-powered “microgrids” have been proposed as an innovative solution.

Opportunities for business under B.C.’s Hydrogen Strategy

The B.C. government has expressly emphasized its intention to support only renewable, low-carbon or zero-emission hydrogen pathways (*i.e.*, green and blue hydrogen). Amongst others, this encourages the following business opportunities:

Manufacturing large-scale electrolyzers

Simply put, an electrolyzer is a system that uses electricity to separate water into hydrogen and oxygen via electrolysis. Green hydrogen is, therefore, produced using "clean electricity" (*e.g.*, wind, solar or hydro power). The current downside of large-scale electrolysis is the production cost, which is largely dependent on the price of electricity. As it stands, this requires electricity rates in the area of $40/MWh. BloombergNEF nonetheless projects that large scale green hydrogen production principally from electrolyzer plants will be comparable to blue hydrogen (*i.e.*, produced from natural gas) by 2030.

It is foreseeable that the B.C. government will procure bids for the development of large-scale electrolyzer plants in the near future. Québec has already paved the way for these developments. In January 2021, Hydro-Québec awarded an engineering contract to build an electrolysis plant capable of generating 11,100 metric tons of green hydrogen per year. Overseas, the EU has revealed its plan to install a number of renewable hydrogen electrolyzers with an aim to produce approximately 10 million metric tons of hydrogen by 2030.

Considering the groundwork laid in other jurisdictions, we expect that B.C. will follow suit to become a world leader in the hydrogen economy. Given that 98 per cent of B.C.'s electricity is renewable, it has already established green hydrogen production as an appealing business opportunity within the province.

Hydrogen injection into existing natural gas infrastructure

P2G technology converts electricity into hydrogen by way of electrolysis, which goes hand-in-hand with green hydrogen production. In other words, this results in a "power-to-hydrogen" system, where the hydrogen can then be injected into the existing natural gas grid, or stored if necessary. The effect of blending hydrogen with natural gas is the reduction of GHG emissions at the point of combustion.

To satisfy CleanBC's proposal that 15 per cent of natural gas consumption must be supplied by renewable gas by 2030, producers and midstream companies will be required to work collaboratively. There must be sufficient integrative infrastructure that allows hydrogen to get from the point of production to the point of injection. In particular, there must be storage and distribution systems in place that are capable of handling hydrogen in both a liquid and gaseous state.

This will be an attractive opportunity for companies already established in the natural gas sector, or companies seeking to gain entrance. Studies will need to be conducted on whether, and to what extent, the existing natural gas storage and distribution systems can sustain hydrogen, either blended or pure. Depending on these results, it is likely that upgrades of the existing infrastructure or the development of new infrastructure will be necessary in order to efficiently and effectively manage hydrogen storage and distribution.

Development of hydrogen microgrids in remote B.C. communities

Microgrids are a relatively novel concept which entail a localized energy grid with control capability. In other words, there is no reliance on a traditional grid and they can operate autonomously. For this to occur, microgrids can rely on a number of power sources. Hydrogen has been promoted for microgrid development since it releases no carbon emissions when burned or used in a fuel cell.

With the majority of remote communities in B.C. relying on diesel generators as a source of power generation, and considering CleanBC's objective to reduce diesel GHG emissions significantly by 2030, there are significant opportunities to develop hydrogen-powered microgrids. As many of these remote communities comprise First Nations, there are also opportunities for First Nations involvement in B.C.'s hydrogen economy through development, ownership and operations of this hydrogen infrastructure.

The "ATCO Hydrogen Microgrid" in Australia exemplifies the feasibility and sustainability of hydrogen-powered microgrids. The project was completed in November 2019, and is noteworthy due to its integration of renewable hydrogen created via electrolysis. Most importantly, it sets a promising precedent moving forward with respect to the potential capabilities of incorporating hydrogen-powered microgrids into B.C.'s hydrogen economy.

Catalyst for rapid hydrogen economy growth

B.C.'s Hydrogen Strategy not only signifies a fundamental step forward in the province's attempt to achieve its goal of net-zero emissions by 2050, it also represents a catalyst for clean-tech innovation and a stimulus for new hydrogen opportunities. It is never too early for companies to consider the viability of these opportunities, as B.C.'s hydrogen economy is poised to grow exponentially in the coming years.

Reach out to any of the key contacts below if you have further questions regarding B.C.'s Hydrogen Strategy or the associated business opportunities.

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