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Carbon capture and hydrogen development central to Western Canada's energy transition

DECEMBER 13, 2021 7 MIN READ

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In 2021, Canada increased its commitments under the *Paris Agreement* and formalized its goal of achieving net-zero carbon emissions by the year 2050. Canada also recently announced at the COP26 conference in Scotland that it will cap emissions from the oil and gas sector. These commitments have spurred a transition in Canada's energy sector towards low- and no-carbon processes, technologies and products. This energy transition will have an impact on broad sectors of the economy, including energy production/generation, transmission, distribution and consumption.

At the energy production and generation level, these developments are leading to increased interest and advancements in energy storage, renewable energy technologies and commercial arrangements that support investment in low-carbon energy, such as power purchase agreements. Among the most significant areas of interest and opportunity in Western Canada are carbon capture, utilization and storage (CCUS) and blue hydrogen. These technologies affect the full energy value chain, from production through to consumption. While each of these emerging technologies and sectors presents significant opportunities to spur economic growth, attract "green" capital into Canada's energy sector and reduce national (and global) emissions, they also introduce a range of technical, economic and legal challenges for companies and governments to navigate.

Why CCUS and blue hydrogen?

"Blue" hydrogen is hydrogen produced from methane in natural gas. It has become a key focus in Western Canada as it represents a unique opportunity to produce a low- or zero-emission fuel while maintaining (or even growing) the oil and gas sector, a staple of Western Canada's economy. With its abundant natural resources, geological setting and existing infrastructure, Canada is well-positioned to be a world leader in hydrogen production, which would reduce national greenhouse gas emissions while creating significant export potential.

Blue hydrogen is generally produced through steam methane reforming (SMR), combining natural gas or a refined petroleum product with steam to release bonded hydrogen. To be "blue" hydrogen, the SMR process must be paired with CCUS to prevent the carbon dioxide (CO_2) released through SMR from being emitted. Blue hydrogen requires plentiful supplies of natural gas or refined petroleum, water for feedstock and access to suitable facilities or reservoirs to securely sequester or process the captured CO_2. Further information about the production process and key considerations can be found in our Emerging technologies in energy: Blue hydrogen publication.

Since spring 2021, several billion dollars' worth of blue hydrogen and CCUS investments have been announced in Canada. The federal and provincial governments have also released

hydrogen policies touting hydrogen as one of the primary ways that Canada will achieve its net-zero carbon goals. However, key uncertainties remain. Carbon capture remains expensive and, in most cases, uneconomic, without higher carbon prices (which are expected in the future, but do not yet exist). Suitable reservoirs for sequestration are abundant in some parts of Western Canada, but not others. From a legal perspective, the regulatory systems in Western Canada also do not specifically address hydrogen production, giving rise to ambiguities and uncertainties for certain types of projects. Three key initiatives are underway to address these uncertainties, at least in part: (1) targeted tax incentives, (2) Alberta's competitive bid process for CCUS hubs, and (3) CCUS carbon offset credits.

Tax incentives

We previously outlined how the federal 2021 budget injected fiscal stimulus into Canada's energy transition. The federal budget contained several key tax incentives in respect of blue hydrogen and CCUS:

- an investment tax credit for capital invested in certain types of CCUS projects (the details of which are still being developed, but are expected to be available in 2022)
- a commitment of $319 million over seven years for Natural Resources Canada to support research and development to improve the commercial viability of CCUS technologies
- a "green project funding initiative" of $4 billion over seven years to the Net Zero Accelerator (adding to the $3 billion over five years committed on December 11, 2020). Proponents of CCUS and blue hydrogen projects may apply to the Net Zero Accelerator to access a portion of this funding

Blue hydrogen developments and facility expansions in Saskatchewan may also be eligible for transferable royalty tax credits of 15% of project costs through the Oil and Gas Processing Investment Incentive.

Alberta's competitive bid process for CCUS hubs

With the increasing industry interest in CCUS and concerns about proliferation of carbonsequestration operations (particularly in areas with limited sequestration potential, such as Fort Saskatchewan), the Alberta government announced a competitive bid process for CCUS "hubs" in the spring of 2021. Alberta is envisioning that, in areas where multiple companies are interested in carbonsequestration, CCUS "hubs" will be developed where sequestration rights are awarded to a single operator who must operate the hub on an "open access" basis and provide competitive market service rates.

Further details of the competitive bid process were announced in September 2021, which we described in our Energy blog. Expressions of interest from potential proponents were due on October 12, 2021. Alberta will post its request for full project proposals in December 2021, with successful proponents expected to be selected in March 2022.

On September 7, 2021, Saskatchewan also announced that it would be exploring opportunities for CCUS infrastructure hubs, although it has not yet announced any details.

Carbon credits and offset opportunities

Both British Columbia and Alberta have frameworks that allow proponents to receive credits if their projects offset and reduce greenhouse gas emissions: the *Greenhouse Gas Emission*

Control Regulation (GGECR) in British Columbia and the *Technology Innovation and Emissions Reduction Regulation* (TIER) in Alberta. These carbon credits form a key revenue stream for eligible project proponents.

In British Columbia, hydrogen manufactured for use in place of petroleum diesel is considered a renewable fuel under the GGECR and is eligible to generate carbon offset credits. The GGECR does not, however, allow CCUS operations to generate carbon credits.

In Alberta, emission offset projects must meet requirements established under the TIER, the Standard for Greenhouse Gas Emission Offset Project Developers and an approved quantification protocol. Alberta has an approved quantification protocol in place for CCUS in deep saline aquifers, but not other types of CCUS (such as sequestration as part of enhanced oil recovery operations).

While Saskatchewan is lagging behind its western neighbours in developing a program for carbon offsets, the government announced on September 7, 2021 that it would develop such a program and that it would specifically allow carbon credits to be generated from CCUS. The details of Saskatchewan's program have not yet been released.

Federally, Canada is in the process of developing a carbon offset credit system, including regulations, offset protocols and a credit and tracking system. The federal government published draft regulations in March 2021, which are expected to be issued in final form by the end of 2021. These draft regulations and associated publications are silent with respect to CCUS, and given Canada's intention to avoid overlap with provincial offset regimes, it appears that the question of whether and how CCUS activities can generate carbon credits will remain a provincial matter.

Across provinces and at the federal level, consultation and government relations activity is taking place among interested industry participants. The goal of many participants is to ensure that the carbon offset protocols being revised or developed are consistent with the principle of additionality (meaning that the activity would not occur absent a market for carbon offset credits) and account for the full range of carbon-reduction technologies or techniques that exist.

The future of blue hydrogen and CCUS

We expect to see significant developments in blue hydrogen and CCUS in Western Canada over the coming year. While many of the initiatives described above are still in the development phase and lack key details, those details are expected to become available in 2022. This will allow project proponents and investors to verify the commercial viability of their projects and take the necessary steps to initiate those projects before their window of opportunity closes. It will also be critical for all levels of government to move quickly to eliminate the remaining barriers to blue hydrogen and CCUS development so that Canada can capitalize on this important opportunity while enabling its existing natural resource sector to thrive into the future.