Enbridge feedback on Geologic Carbon Storage in Ontario

ERO Number: 019-4770
March 14, 2022

About Enbridge Inc.

Enbridge Inc. is a leading North American energy infrastructure company. We safely and reliably deliver the energy people need and want to fuel quality of life. Our core businesses include Liquids Pipelines, which transports approximately 25% of the crude oil produced in North America; Gas Transmission and Midstream, which transports about 19% of the natural gas consumed in the U.S.; Gas Distribution and Storage, which serves approximately 3.8 million retail customers in Ontario and Quebec; and Power Operations. Together, our renewable energy projects (either operating or under construction) have the capacity to generate 2,075 MW of net renewable power in North America and Europe.

Our regulated utility Enbridge Gas Inc. ("Enbridge Gas") is Canada's largest natural gas storage, transmission and distribution company based in Ontario with a more than 170-year history of providing safe and reliable service to customers and heats over 75% of Ontario homes.

Life takes energy and Enbridge exists to fuel people's quality of life. For more information, visit: www.enbridge.com.

Executive Summary

Enbridge is uniquely positioned to build, transform and maintain the low-carbon energy system Ontario needs. Climate change requires serious attention, and Enbridge is well equipped to be a part of the solution. Across our business, we've committed to achieve net-zero greenhouse ("**GHG**") emissions by 2050 and to reduce our emissions intensity 35% by 2030.

We are pleased to provide this submission in response to the Ministry of Northern Development, Mines, Natural Resources and Forestry's (the "**Ministry's**") Discussion Paper on Geologic Carbon Storage in Ontario (the "**Discussion Paper**"). We are encouraged that the Government of Ontario (the "**government**") is seriously exploring ways to enable and support the safe and permanent sequestration of carbon dioxide ("**CO2**") in the province, which we see as critical to ensuring the long-term competitiveness of many hard-to-abate, emission intense, trade exposed ("**EITE"**) sectors of Ontario's economy, including steel and cement production, oil and gas refining, petrochemicals, and gas-fired power generation. Carbon sequestration will also be critical to unlocking low-cost low carbon hydrogen production in southwestern Ontario.

In developing a regulatory framework for carbon capture and sequestration ("**CCS**")[1] in Ontario, we encourage the government to be guided by five key principles:

1. Positioning Ontario as a CCS leader;
2. Removing the regulatory barriers to CCS in Ontario;
3. Creating a streamlined approval regime for new CCS projects;
4. Encouraging commercial-scale CCS projects; and
5. Facilitating cost-effective and scalable carbon capture, utilization and sequestration ("**CCUS**") infrastructure across the province.

Enbridge fully supports and encourages the government to move quickly to make needed legislative and regulatory changes that would enable and support geologic sequestration of CO2.

Summary of recommendations

Building on the five key principles above, Enbridge offers the following recommendations in response to the Discussion Paper. We recommend the Ministry:

1. Expedite the consultation and amendments necessary to fully enable and support CCS in Ontario to take advantage of Ontario's unique geology, the environmental imperative and business case for CCS and the growing regulatory momentum in this space.
    a. Provide a clear signal to industry by Q3 2022 with a timeline for legislative changes to help ensure CCS investment continues to focus on potential opportunities in Ontario.
2. Amend the relevant legislation and regulations to remove the barriers to CCS in Ontario:
    a. Amend *Oil, Gas and Salt Resources Act* ("**OGSRA**") to revoke section 11(1.1) in its entirety, thereby removing the prohibition on the use of wells for CO2 injection in underground formations generally or for enhanced oil and gas recovery; and
    b. Amend the *Mining Act* to allow for storage leases that authorize the permanent storage of CO2 on Crown lands, while ensuring that such leases can cover broad geographic areas and be applicable to specific stratigraphic zones.
3. Establish a streamlined approvals regime for new CCS projects to provide certainty to investors and emitters:
    a. Enact a permitting regime for CO2 wells, injection activities and related surface facilities such as CO2 pipelines, which is modelled after the existing regime for compressed air energy storage ("**CAES**") projects under the OGSRA;

[1] While this submission makes reference to CO2 pipelines, it is important to note that other means of transportation, including by rail, truck or ship, may be viable options especially for those emitters located at a great distance from injection sites.

b. Ensure this regime is flexible and avoids any limits on the types of storage applications that proponents might submit;
c. Ensure the application review process is expedited and subject to regulatory review timelines;
d. Adopt the relevant aspects of CSA Z-741 and Z-341 Codes, as appropriate for CO2 in Ontario; and
e. Enact a process for land rights acquisitions that ensures sufficiently large blocks of pore space can be efficiently acquired by a potential project developer and the Ontario Lands Tribunal can resolve disputes over pore space acquisition.

4. Create regulatory framework to encourage commercial CCS projects:
    a. Amend the EPS to allow CO2 that is captured from a covered facility and appropriately sequestered to be deducted from a covered facility's verified emissions;
    b. Create a carbon offset system in connection with the EPS and develop a project methodology for CO2 sequestration that would allow offset credits to be issued to voluntary CCS projects that take place outside the covered sectors; and
    c. Ensure there is an appropriate transfer of long-term responsibilities for stored CO2, following the model established in Alberta.
5. Ensure scalable and cost-effective CCS infrastructure development:
    a. Ensure that any regulatory amendments designed to facilitate an initial set of CCS projects can be leveraged in the future to approve more extensive CCS infrastructure, as Alberta is doing under the MMA; and
    b. Design the regulatory regime for CCS projects to minimize costs, while still ensuring public safety, in part by adopting open access policies to third parties and non-discriminatory rates where appropriate.

The following submission describes these recommendations in detail, after first providing some background on Enbridge's extensive experience and involvement with CCS across the country.

Enbridge and CCS

Enbridge is deeply engaged in the energy transition underway today. We have taken deliberate steps to diversify our business to include lower-emission energy sources and we have made early, strategic investments in low-carbon solutions, including hydrogen, renewable natural gas, and compressed natural gas. Through our gas distribution business's leading energy efficiency programming, we are helping residential, commercial, and industrial customers lower both energy costs and emissions. Enbridge's leading position in the global energy transition positions us well to assist in the development of CCS infrastructure in Ontario and the delivery of CCS and low carbon services for our customers, including in EITE sectors.

Enbridge has long been involved in the CCS space. For example:

- **Project Pioneer** – In 2011, Enbridge partnered with TransAlta Corporation and Capital Power Corporation on Project Pioneer which aimed to capture 1 Mtpa of CO2 from TransAltas Keephills 3 power plants west of Edmonton, Alberta. Project Pioneer assessed CO2 storage in the Nisku formation through a drilling program that included an extensive characterization plan.
- **Wabamun Area Sequestration Project (WASP)** – The Wabamun Area Sequestration Project (WASP) was a University of Calgary-led project with industry partners that included Project Pioneer partners Enbridge and TransAlta. The project involved a comprehensive characterization study of large-scale CO2 sequestration opportunities in the Wabamun area, west of Edmonton, Alberta. It examined the feasibility of storing 20 Mtpa of CO2 per year within a 60 km by 90 km area extending south of the Wabamun Lake area. The Nisku formation was selected as the primary target for CO2 sequestration.

- **Alberta Saline Aquifer Project** – Enbridge and Capital Power (then EPCOR) co-launched the Alberta Saline Aquifer Project (ASAP) in 2007. Led by Enbridge, this project was a broad-based initiative to advance carbon sequestration technology and capacity in Alberta. Initially comprising a group of 19 private sector companies, the number of ASAP participants eventually grew to 36 industry participants, one academic institute, and one research institute. This project was aimed at gaining a better understanding of the potential costs, procurement constraints, and technological considerations of the various components required for successful carbon sequestration projects.
- **Fort Nelson Carbon Storage Project** – In 2012, Spectra Energy (which combined with Enbridge in 2017) explored the technical and economic feasibility of sequestering carbon from a commercial natural gas processing facility in Fort Nelson in a deep carbonate saline formation in northeast British Columbia.

Ultimately, these CCS projects did not proceed because the policy landscape at the time did not support the projects' economics. We are very encouraged to see this changing in Canada and, specifically, Ontario.

Today, we're actively pursuing CCS opportunities across North America, including the development of the Open Access Wabamun Carbon Hub in Alberta, west of Edmonton. This hub is being developed with local Indigenous partners to support near-term carbon capture projects announced by Lehigh Cement and Capital Power.

Finally, it's worth highlighting that Enbridge has significant, transferrable experience operating natural gas storage facilities. Enbridge manages approximately 440 billion cubic feet ("**Bcf**") of natural gas storage capacity across North America, including 280 Bcf of networking storage through our storage operations at the Dawn Hub and other Enbridge Gas locations in southwest Ontario.

1. Positioning Ontario as a CCS leader

Enbridge strongly believes there is an opportunity to position Ontario as a world leader in the deployment of CCS technology and drive the creation of a new "made in Ontario" emissions reduction industry. The province has unique geology conducive to CCS, a commitment to the environment and public safety and an industrial base looking for GHG reduction options, which together make a compelling case for CCS investments. However, to take advantage of this opportunity, the province must move quickly to remove the legislative and regulatory barriers and establish a new approvals regime, with the appropriate incentives, for these projects.

Ontario's geology

Ontario's geology offers many opportunities for CCS. Southwestern Ontario, in particular, ranked 3rd of 11 basins in Canada for the best geology for CCS.[2] This geology is in close proximity to significant CO2 point sources. According to a 2004 study by the University of Waterloo:

- Two different major reservoirs with approximate storage capacities of 289 million and 442 million tonnes are identified in southwestern Ontario for CO2 sequestration, one located in the southern part of Lake Huron and the other located inside Lake Erie.[3]

These reservoirs offer a significant resource to store CO2 produced by large emitters including hard to abate industrial facilities in southwestern Ontario. A subsequent study published in part by the Ontario Ministry of Natural Resources highlights significant opportunities for the geological storage of CO2 in

[2] Natural Resources Canada/CANMET Energy Technology Centre, Canada's CO2 Capture & Storage Technology Roadmap (March 2006), Table 3.2.

[3] CO2 sequestration in Ontario, Canada. Part I: Storage evaluation of potential reservoirs, Energy Conversion and Management, 45(17):2645-2659 (October 2004).

several locations in proximity to point sources of CO2, with preliminary studies indicating the potential to store up to 730 Mt of CO2 in saline aquifers in deep geologic formations.[4] The federal government has several research initiatives underway currently, including work to better understand "understudied reservoirs", including those in Ontario[5].

We strongly believe Ontario has the geological potential to attract significant investments in CCS, which could position the province as a leader in this space.

Environment and safety

CCS represents a significant opportunity to help Ontario achieve GHG reduction targets. We agree with the International CCS Knowledge Centre when it writes, "Carbon capture technology will be an essential part of Canada's increased 2030 ambitions and net zero commitments and its deployment will see megatonne (Mt) impacts that can extend well beyond 15 Mt a year with the correct enabling mechanisms."[6]

For comparison, in 2019, Ontario reported 138 Mt of CO2 emissions.[7] Stationary combustion sources represented 58.6 Mt of CO2. Industrial processes and product use accounted for 18 Mt. Certain sectors of industry are particularly CO2 intensive with cement and lime production accounting for 2.8 Mt and iron and steel production accounting for 8.2 Mt. If they are to continue to operate in the face of Canada's quickly escalating carbon price, some of these industries will need to strongly consider CCS as the primary means to reduce their emissions.

Interestingly, and most significantly for the future potential of CCS, most of the province's largest emitters are in the portion of the province with the most geologic potential for CCS. Based on 2019 data, in Ontario, there were 347 sites reporting a total of 30 Mt of CO2 with most of them being in Southwestern Ontario.[8]

Given the 20–30 Mt/y of emissions from large emitters in Southwestern Ontario that are reasonably close to the potentially suitable geology discussed above, and assuming 730 Mt of ultimate potential capacity, that represents 24–36 years of potential sequestration. The potential for CCS in Ontario is significant and can help Ontario achieve substantial GHG reductions, while providing time for other emerging technologies to be brought to market to enable further GHG reductions. Ontario needs access to all of the possible technologies and methods of GHG mitigation and that includes CCS in the near term in order to meet the provincial GHG reduction targets.

Importantly, CCS not only offers this material environmental benefit; it is also safe. According to a study published in Nature, "Overall our findings indicate that geological storage of CO2 is a secure, resilient and feasible option for climate mitigation even when applying pessimistic values for input parameters and in poorly regulated storage scenarios. Hence, deployment of carbon capture and storage can be recommended to all governments as part of their actions to comply with the Paris 2015 target of keeping the global mean temperature rise well below 2 °C." The study found that the safety improves when a robust regulatory regime for CCS is in place.[9] Similarly, a study published in January 2022 in Frontiers of

[4] Ontario Ministry of Natural Resources, Geological Sequestration of Carbon Dioxide: A Technology Review and Analysis of Opportunities in Ontario (2007).
[5] Natural Resources Canada, "
[6] Canadian Budget 2021 – CCS Tax Incentive Considerations (International Knowledge Centre, 2021) (CCS Tax Incentive Considerations)
[7] 163 Mt of CO2 equivalent. See: UNFCCC, Canada 2021 National Inventory Report (NIR), page 26 of Part 3.
[8] Government of Canada, Canada's Official Greenhouse Gas Inventory – Open Government Portal.
[9] Nature Communications, Estimating geological CO2 storage security to deliver on climate mitigation (June 12, 2018).

Earth Science highlighted that "[e]xtensive studies have illustrated with very high confidence that CO2 stored in thoroughly screened sites is safe over geological timescales, and leakage is unlikely."[10]

In practice, large CCS projects have been safely developed and operated for decades now. For example:

According to the US National Energy Technology Laboratory:

- Examples of efforts that have been successfully storing CO2 on a large-scale include the Sleipner Project in the North Sea (in operation since 1996) and the Weyburn Project in Saskatchewan (operated from 2000 to 2012). In addition, large-scale CO2 research projects are being conducted by the U.S. Department of Energy (DOE) in various geologic settings across the United States. These include injection efforts underway by the Regional Carbon Sequestration Partnerships (RCSPs). To date, more than 14 Mt of CO2 have been successfully injected and 10.5 Mt of CO2 has been successfully stored as part of the RCSP large-scale storage efforts. The vast amount of evidence attained from enhanced oil recovery (EOR), gas storage, research and development (R&D), and commercial-scale CCS efforts suggests that CO2 storage is safe, assuming that sites are well-selected, designed, and operated appropriately.[11]

- The National Academy of the Sciences of the U.S. similarly found that "[t]he CO2 CRC Otway Project, located in southeast Australia, is a midscale demonstration utilizing a depleted gas field for storage…. There have been 65,445 tonnes stored at Otway, with no safety issues arising and monitoring results showing that there is sound understanding of the storage process." The Academy also noted that approximately 5 Mt of acid gas (CO2 and H2S) has been safety stored in Canada.

CCS therefore offers a safe means to achieve our important climate goals.

Economic opportunities

Energy transition scenarios generally view CCS as essential to meet our shared climate and GHG emissions reductions objectives. Several industries critical to the Canadian economy – for example, oil and gas, iron and steel, cement, fertilizer, power generation, aviation, shipping and heavy-duty transportation – are looking seriously at CCS as a viable, if not essential, decarbonization pathway. We agree with a recent Labor Energy Partnership report that stated, "Few emissions reduction pathways besides CCUS can so directly preserve and enhance the prosperity of communities while contributing to national climate ambitions."[12] The Government of Canada described the opportunity similarly when it stated, "[a]s part of a just transition towards Canada's decarbonized future, CCUS projects can help retain jobs in trade-exposed, emissions-intensive industrial sectors, which employ hundreds of thousands of Canadians (e.g. oil & gas, cement, iron & steel, chemicals) and are essential to Canada's economy".[13]

Ontario's large emitters and heavy industry, and especially EITE industry need every potential tool available to help it stay competitive with other jurisdictions with lower or no carbon charges or compliance obligations. CCS can address both post-combustion and process emissions associated with many large emitters, thus allowing them a viable option to mitigate their GHGs by capturing them and permanently sequestering or storing them underground.

Many large EITE industries with operations in Ontario have sister facilities in other jurisdictions that foster, encourage and support CCS. Ontario needs CCS rules and processes in place to favourably compete

[10] Frontiers in Earth Science, A Hierarchical Framework for CO2 Storage Capacity in Deep Saline Aquifer Formations (January 18, 2022).
[11] US National Energy Technology Laboratory, "Permanence and Safety of CCS".
[12] Labor Energy Partnership, Building to Net-Zero: A U.S. policy blueprint for gigaton-scale CO2 transport and storage infrastructure (June 2021).
[13] Canada's Carbon Capture, Utilization & Storage Strategy: Towards a Prosperous, Net-Zero Economy of the Future – July 2021 Draft (Canada's CCUS Strategy)

with the legislative and regulatory environment in other jurisdictions like Alberta and the U.S. to retain these businesses and jobs and to support their future growth under a low carbon regime.

The federal government is committed to CCS and has announced several funding programs for this technology. The Ontario government should continue to work with Enbridge, industry and other levels of government to develop a streamlined framework for CCS opportunities in order for Ontario to be able to take advantage of federal opportunities. Provincial funding will help to kickstart CCS and can go a long way to leverage co-funding from industry and the federal government.

Regulatory momentum

For Ontario to become a leader in CSS, we strongly believe that it must quickly seize the momentum developing in this space. There is currently significant federal interest to advance CCUS; Canada's CCUS strategy identifies that this infrastructure is "essential" and "a significant opportunity for Canada", noting that:

> CCUS is one of the four key technology areas critical to achieving global climate and energy goals and urgent steps are needed to significantly ramp up CCUS deployment. The International Energy Agency has made clear that these net-zero goals will become virtually impossible to meet without CCUS. Their Net-Zero to 2050 Roadmap indicates that driving down emissions to net-zero would require 7.6Gt of CO2 to be captured globally – which is 190 times more than today.[14]

Canada's Hydrogen Strategy also noted the importance of CCS for carbon neutral hydrogen:

> To achieve Canada's net-zero by 2050 target, all hydrogen production will need to be carbon-neutral - which includes electrolytic hydrogen from non-GHG emitting electricity, or hydrogen produced from fossil fuels coupled with CCUS – or it will need to be offset, for example through direct air capture of CO2. At present, fossil fuel derived hydrogen with CCUS is more cost-competitive than electrolytic hydrogen in Canada, particularly due to our abundance of low-cost natural gas.[15]

We are pleased to see signals demonstrating early progress on regulatory and legislative momentum in Ontario as well. We acknowledge Ontario's Fall 2021 Red Tape Reduction Package, which highlighted the Ministry's efforts to review the existing regulations that currently prohibit CCS in the province.[16] We also note the Minister of Energy's Directive Letter to IESO Regarding the Future of Natural Gas Generation, which highlighted " …the possibility of maintaining the generating facilities but replacing natural gas with green fuels such as hydrogen and renewable natural gas, or the development of utility-scale carbon capture and storage."[17]

We encourage the government to seize on this momentum in a manner that encourages timely investment in CCS in the province. The timing of the necessary legislative and regulatory change will be critical if the province is to attract this investment, which in many cases will require advanced planning given the significant capital expenditures involved. In addition, many large emitters are global companies which have choices in terms of where to invest in upgrades and maintenance, and Ontario stands to lose out in the competition without timely access to CCS.

Recommendations

[14] Natural Resources Canada.

[15] Natural Resources Canada et al, Hydrogen Strategy for Canada: Seizing the Opportunities for Hydrogen - A Call to Action (December 2020).

[16] Ontario Newsroom, Ontario Removing Barriers to Support People and Businesses (October 7, 2021).

[17] Ontario Minister of Energy, Letter to IESO Regarding the Future of Natural Gas Generation (October 7, 2021).

Given Ontario's unique geology, the environmental imperative and business case for CCS and the growing regulatory momentum in this space, Enbridge recommends that the Ministry expedite the consultation and amendments necessary to fully enable and support CCS in Ontario. Provide a clear signal to industry by Q3 2022 with a timeline for legislative changes to help ensure CCS investment continues to focus on potential opportunities in Ontario. As discussed in the sections below, this can be done by removing regulatory barriers, creating a streamlined approvals regime and creating regulatory incentives for CCS projects.

2. Removing the regulatory barriers to CCS

As a first step to fully enable and support CCS, Ontario must remove the regulatory barriers that currently prohibit the development of CCS projects in the province. As highlighted in the Discussion Paper, the Ministry must amend the OGSRA and *Mining Act* to revoke restrictions that are no longer relevant in the current environment.

Amendments to the OGSRA

The Discussion Paper acknowledges that the OGSRA currently prohibits CO2 injection for certain activities, including projects to inject and store CO2 in underground geological formations. Section 11(1.1) of the OGSRA also prohibits the Ministry from issuing a permit to authorize this activity.

CCS projects will not be developed in Ontario if this prohibition remains in place. Enbridge is supportive of the suggestion in the Discussion Paper to remove the prohibition in section 11(1.1) of the OGSRA; at a minimum, this section should be amended to allow for CO2 injection for the purposes of carbon sequestration, including in an underground geological formation, provided a permit from the Ministry is first obtained. Enbridge suggests CCS be added as a prescribed activity similar to CAES.

The climate benefits of CO2 use in EOR are real: life cycle analyses (which include impacts from potential increases in oil consumption) show that EOR results in a 37% reduction in CO2 emissions per barrel of oil produced relative to conventional oil production.[18] We believe achieving Canada's ambitious climate goals can only be met by pursuing the widest possible suite of emission reduction pathways, and that includes permanent storage of CO2 via EOR.

Enbridge disagrees that the OGSRA should continue to prohibit CO2 injection in connection with enhanced oil and gas recovery projects. This proposed restriction is unnecessary and will effectively eliminate many old, depleted reservoirs that may otherwise be technically suitable from even being considered because of the possibility of additional oil being produced. This proposal will likely have the effect of restricting the number of feasible CCS projects in the province. And even if the injected CO2 is used for enhanced oil recovery, there could still be a significant net carbon reduction given the sequestered CO2 involved. We recommend that the OGSRA be amended to revoke section 11(1.1) in its entirety. This would allow the Ministry to evaluate each application for a CCS project on its own merits, including in terms of its net climate benefit, before issuing it a permit to proceed.

Amendments to the *Mining Act*

The Discussion Paper acknowledges that Part IV of the *Mining Act* prohibits the permanent storage of any substance (including CO2). Section 101.1(2) of the *Mining Act* states that Crown land storage leases issued under section 101(1) cannot authorize the permanent disposal of any substance.

[18] CO2 EOR Yields a 37% Reduction in CO2 Emitted Per Barrel of Oil Produced (Clean Air Task Force, 2019)

This prohibition severely restricts access and utilization of much of the potential geological formations that may be available for CCS in Ontario. As discussed above, some of the most promising reservoirs for CCS in southern Ontario are found underlying parts of Lake Huron, Lake St. Clair and Lake Erie. By prohibiting permanent storage leases in these areas, section 101(1) effectively restricts these areas for CCS. Furthermore, section 16 of O. Reg. 263/02 under the *Mining Act* prohibits the granting of storage leases for underground formations for all but a short list of specified substances, which does not include CO2. We also recommend that CO2 be added to this list.

Enbridge supports the changes to the *Mining Act* that are under consideration that would allow for storage leases to authorize permanent CO2 storage on Crown land. Enbridge also recommends that, in entering into permanent CO2 storage leases, the Ministry incorporate provisions that would transfer the liability of stored CO2 to the Crown after certain conditions are met, following the successful Alberta model for this approach. This approach, which is discussed further below, will help create the correct incentives for CCS, as it has done in Alberta.

The *Mining Act* amendments should ensure that future storage leases can authorize CO2 storage in broad geographic zones and allow leases by stratigraphic zone where appropriate. CCS activities are expected to target large regional reservoirs over broad areas in order to achieve economies of scale and keep CCS costs competitive. Although these details will be the subject of the leases themselves, and the process to award them, the *Mining Act* amendments should not restrict these features. Clarification should also be provided as soon as possible regarding the locations for which these leases will be considered – for example, whether they would be considered for Crown land "on shore", such as provincial parks, and whether leases will be made available for storage beneath any areas of the Great Lakes within Ontario's jurisdiction.

Enabling complimentary amendments

Although the proposed amendments to the OGSRA and *Mining Act* will remove the primary regulatory barriers to CCS in Ontario, complimentary amendments will also be necessary. In particular, in parallel with removing these barriers, we encourage the government to complete consultation on (1) proposed amendments to establish a streamlined approvals regime, as discussed in section 3 below; and (2) proposed amendments to create a regulatory framework that supports and encourages CCS projects. Without these complementary amendments, removing the barriers in the OGSRA and *Mining Act* alone will be insufficient to attract significant investments in CCS in the province.

Recommendations

Enbridge recommends that:

- The OGSRA be amended to revoke section 11(1.1) in its entirety, thereby removing the prohibition on the use of wells for CO2 injection in underground formations generally or for enhanced oil and gas recovery;
- The *Mining Act* be amended to allow for storage leases that authorize the permanent storage of CO2 on Crown lands, while ensuring that such leases can cover broad geographic areas and be applicable to stratigraphic zones;
- In parallel with these amendments, the government complete consultation on key complimentary amendments, discussed further below, which will be necessary to create an attractive regulatory framework that encourages commercial CCS project; and
- The government establish an indicative timeline (by Q3 2022) to outline the expected key milestones dates for the development and adoption of various legislative and regulatory changes (including the new regimes and amendments described in sections 3 and 4 below).

3. Creating a streamlined approvals process

In order to attract capital at reasonable rates of return, the approval and licensing process for CCS projects need to be well understood and transparent. The Discussion Paper mentions two separate pathways: a presumably simpler “demonstration / pilot” process and a more robust process for a “commercial scale” project. While Enbridge generally supports a simpler approach for test wells and demonstration / pilot projects, the new approval and licensing process must also be available to commercial-scale projects at the outset, as well as providing a clear process and pathway for a demonstration or pilot project or test well to be “converted” into a commercial scale operation. The costs of pilot projects are likely in the $5 to 10 million range and if these investments are subject to a “secondary re-approval risk”, this will deter investment. Therefore, Enbridge encourages the development of an approval process that can accommodate an expedited review of either demonstration/pilot projects, or commercial-scale projects, at the outset, as was done in Alberta.

Leveraging existing regulations

We encourage the Ministry to model a new permitting regime for CCS projects based on the recently enacted amendments to the OGSRA for CAES projects.

The CAES project approval regime was enacted through amendments to the OGSRA and Ontario Regulation 245/97. These amendments establish a process whereby CAES proponents can apply for a well license under section 10 of the OGSRA and an injection license under section 11 of the OGSRA. Applications for these approvals must be sought in accordance with the MNRF’s *Provincial Standards for Compressed Air Energy Storage Applications and Operations* (the “**Provincial Standards**”), except where a departure from these standards has been approved by the MNRF. Section 2.1(3) of O. Reg. 245/97 and the Provincial Standards set out the information requirements for applications for both well licenses and injection permits, including the necessary public and Indigenous consultation requirements that must be followed.

This existing framework can be leveraged for the purposes of approving future CCS projects. In particular, we recommend the Ministry consider amendments to the OGSRA and O. Reg. 245/97 that follow the CAES-related amendments, with the following exceptions:

- The application criteria for CCS projects should be comprehensively set out in O. Reg. 245/97;
- Applications should not be restricted to certain pore space, reservoirs, geographic locations or technologies, as this could unduly restrict good projects from being developed;
- A provincial standard should be developed for CCS projects, as was done for CAES projects through the *Provincial Standards for Compressed Air Energy Storage Applications and Operations* (which are incorporated by reference in O. Reg. 245/97 under the OGSRA);
- The new provincial standard for CCS projects should incorporate certain relevant aspects of Canadian Standards Association (CSA) Z741-12 Standard – Geological Storage of Carbon Dioxide Please see below for further information regarding the CSA Code; and
- Applications should be reviewed on an expedited basis in accordance with a reasonable service guarantee. We would recommend that O. Reg. 245/97 be amended to require that the Ministry review and render decisions on complete applications within 6 months of their filing.

We recommend that a CAES-style approval regime for CCS projects would result in the issuance of both the necessary well licenses and injection permits. Pipelines and other surface facilities between the wellhead and the source of CO2 being sequestered would be regulated by any applicable laws of general application, and to the extent possible, should be reviewed and approved at the same time. In this way all related facilities can be appropriately considered and reviewed in their entirety. This would also be a similar approach to that taken for CAES projects, where the approvals scheme covers the works between the wellhead and the emergency shutdown valve (or first isolation valve, as applicable). Surface activities (such as equipment, piping, etc.) beyond the emergency shutdown valves are not regulated by the MNRF

but rather subject to other regulations of general application, which may include municipal approvals, environmental compliance approvals and the regulations under the *Technical Standards and Safety Act*. To ensure the timely approval of new CCS projects, however, we believe it is critical that the review of all relevant facilities occurs in parallel.

In developing the new approval regime for CCS projects, it will be critical for the Ministry create a standardized set of application requirements under the OGSRA, which could be clearly set out in the new provincial standard for CCS. In our view, these application requirements should include a single, defined, and standardized set of environmental and consultation requirements that would apply to all CCS projects in the province, and which would be the sole environmental and social assessment process for these projects, regardless of whether they are located on Crown or private lands. This regulatory clarity will be key to ensuring that project proponents can undertake the necessary consultation and environmental and related studies prior to submitting an application, which in turn will help avoid delays in the application review process.

We understand that the Ministry has recently published specific regulations for CAES storage in porous rock reservoirs under the OGSRA. Once Enbridge has studied the new regulation in detail, we would be happy to provide further feedback on whether and to what extent those regulations would also be relevant for a future CCS approval regime.

In the meantime, the Ministry can leverage the recent regulatory amendments that were enacted to facilitate CAES projects in salt caverns in order to develop a comparable regime for CCS in Ontario.

Adopting the CSA Codes and Standards

In developing a new approvals regime for CCS projects, we encourage the Ministry to adopt the relevant aspects (as appropriate for Ontario), of CSA Codes and Standards. CSA Standards are produced by experts in industry and academia from Canada, the U.S. and around the world. They provide an excellent framework for Ontario, and Enbridge encourages and supports the adoption of the relevant aspects of these standards in the province.

The CSA Z741 Standard is already in use in various jurisdictions in North America. In British Columbia, for example, section 80(3) of the Drilling and Production Regulation under BC's *Oil and Gas Activities Act* requires that every permit holder for a well that is part of a special CO2 storage project construct and operate the well in accordance with the CSA Z741 Standard. Although Alberta does not expressly adopt the CSA Z741 Standard in its CO2 sequestration licensing regime under its *Mines and Minerals Act* (the "**MMA**"), the Alberta Energy Regulator ("**AER**") requires compliance with engineering and safety standards, including CSA standards. The CSA Z741 Standard is also referenced in the province's offset project methodology for CO2 Capture and Permanent Storage in Deep Saline Aquifers.

We would be happy to provide the Ministry with further feedback on the aspects of the CSA Z741 Standard that are appropriate for CCS projects in Ontario.

The CSA Z341 Standard ("**CSA Z341**") covers the underground storage of hydrocarbons in salt caverns and depleted reservoirs. CSA Z341 sets the minimum requirements for the design, construction, operation, maintenance, abandonment, and safety of hydrocarbon storage in underground reservoir formations, salt caverns, and the associated equipment. The equipment consists of storage wellheads and associated valving; wells and subsurface equipment; and safety equipment, including monitoring, control, and emergency shutdown systems. For storage in depleted reservoirs, hydrocarbons are limited to natural gas. Storage of hydrocarbons in salt caverns are limited to crude oil, diesel, natural gas, methane, ethane, propane and butane. CSA Z341 provides an outline of requirements for geological and engineering studies that help to define the limits and operating parameters of the storage zone. It also outlines the requirements for risk assessments, including a review of neighbouring activities, both within and outside of the storage area. Finally, CSA Z341 provides technical guidance for storage projects from

inception, through development and operation to abandonment. As such, CSA Z341 provides a proven base upon which to build requirements for CCS.

Facilitating land rights acquisitions

Many CCS projects will require access to large underground reservoirs, especially where the CO2 is injected into a deep saline aquifer. Where these projects take place on private lands, there may be a need to secure land rights from a significant number of private parties. We therefore recommend that the government ensure that a process is in place whereby an application can be brought to the Ontario Lands Tribunal ("**OLT**") to expropriate the necessary pore space rights where it is reasonably necessary. The OLT currently has the authority to resolve disputes concerning rights, privileges and interests conferred under the authority of the Mining Act, such as disputes in relation to temporary underground Crown-land storage rights[19] and this should be extended to CCS activities.

Finally, we note that there may be need to ensure that new CCS projects can be properly situated to the extent they are near any existing natural gas storage infrastructure. In that regard, if the Ministry determines that any CCS operations may impact operations in a designated gas storage area, it may refer the matter to the OEB (and may be required by the OGSRA to make such referral in certain circumstances).

Recommendations

Enbridge recommends that the Ministry:

- Enact a permitting regime for CO2 wells, injection activities and related surface facilities such as CO2 pipelines, which is modelled after the existing regime for CAES projects under the OGSRA;
- Ensure this regime is flexible and avoids any limits on the types of storage applications that proponents might submit;
- Ensure the application review process is expedited and subject to regulatory review timelines;
- Adopt the relevant aspects of CSA Standards Z741 and Z341, as appropriate for CO2 in Ontario; and
- Enact a process for land rights acquisitions that ensures that sufficiently large blocks of pore space can be acquired by a potential project developer and regarding which the OLT can resolve disputes over pore space acquisition.

4. Encouraging commercial-scale CCS

Even if a robust permitting regime is enacted, the value proposition for CCS in Ontario is unclear. While the federal government undertook consultations related to a CCUS investment tax credit in 2021, the specific design, rates and eligible applications have yet to be released. In addition, recent changes to the scope of the proposed federal Clean Fuel Regulation ("**CFR**") have resulted in CCS projects being excluded from CFR credit generation opportunities where the facilities are not within the liquid fossil fuel supply chain. With the exception of refineries and hydrogen producers that deliver to refineries, this exclusion prevents EITE industries, such as chemical, cement, steel and power producing facilities, which may be ideally suited for CCS, from receiving recognition for CCS activities or participating and benefitting from this market. For the small number of Ontario facilities that may be eligible to generate CFR credits from CCS activities, the value of these CFR credits will remain unknown until the program is finalized and the CFR credit market is established, which is not likely to occur until the first remittance of CFR compliance credits occurs (likely, Q4 2023).

[19] Ontario *Mining Act*, s. 105(1).

That said, if CCS can be used to reduce the carbon costs a covered emitter would otherwise have to pay under Ontario's Emissions Performance Standard ("**EPS**"), the value proposition for CCS becomes readily apparent, especially as the price of carbon increases in the coming years. Therefore, amendments to the EPS are necessary to ensure the appropriate regulatory incentives exist for emitters to invest in cost-effective CCS projects to reduce their emissions.

Amending the Emissions Performance Standards

Under the EPS, a facility cannot lower its verified GHG emissions through the capture and sequestration of emitted CO2. In an October 22, 2021 posting on the Environmental Registry of Ontario, the Ministry of the Environment Conservation and Parks ("**MECP**") stated, "[c]urrently under the EPS program, any amount of CO2 that is captured under carbon capture and storage is still considered as an emission by the facility that originally generated the CO2. We will consider this issue in the future, with consideration for the updated federal benchmark for the 2023-2030 period and alignment with national/international practices."

Unfortunately, by disallowing covered facilities to reduce their verified emissions through CCS activities, the EPS takes away one of – if not the – primary incentives for covered facilities to invest in CCS projects: the incentive to reduce their EPS compliance costs. Without that incentive, many covered facilities will not have an incentive to make the material long-term capital expenditures required to install CCS technology at their sites.

The current approach under the EPS is at odds with the standard practice, both domestically and internationally. For example:

- Under the federal Output Based Pricing System, reported facility emissions are reduced by the amount of CO2 captured from the facility that is stored underground;
- Under Alberta's TIER program, covered facilities can similarly reduce their emissions through the capture and storage of CO2 at their sites;
- The Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms provides that an entity that supplies CO2 has an aggregated compliance obligation based on the sum of Mt CO2 included in verified emissions data report minus CO2 verified to be geologically sequestered through use of a California Air Resources Board-approved carbon capture and geologic sequestration quantification methodology that ensures that the emissions reductions are real, permanent, quantifiable, verifiable, and enforceable.[20]
- In Europe, since the 2015 amendment to the Emissions Trading Directive, capture, transport and storage installations are explicitly included in the ETS. If CO2 is stored within EU and European Economic Area jurisdictions in accordance with the European Commission's CCS Directive, then the CO2 will be considered as "not having been emitted" under the ETS.[21]

Similar changes would be straightforward to enact under the EPS. Section 9, Part vi, under Schedule 5 already requires the reporting of:

> A. CO2 that would otherwise have been directly released into the atmosphere but was captured at the facility.
>
> B. CO2 that is transferred from the facility to an injection site.
>
> C. CO2 that was captured and injected into a long-term geological storage site or an enhanced fossil fuel recovery operation.[22]

It would be straightforward to allow the subtraction of these amounts from a covered facility's verified emissions. In particular, Enbridge recommends subtracting CO2 quantified under parameter D of the reporting methodology, and increasing the scope of activities that may capture CO2 from its operations, beyond urea and hydrogen production. In this manner, subtracting captured and sequestered CO2 from a

[20] California Code Regs. Title 17, § 95852 (Emission Categories Used to Calculate Compliance Obligations), para. (g).

[21] European Commission, Carbon capture, use and storage: FAQ - How is CCS treated under the EU ETS.

[22] O. Reg. 390/18, Schedule 5, s. 9, para. vi.

covered facility's verification amount could result in the creation of excess performance units that could be sold between covered facilities. The value of these excess performance units is critical for covered emitters to justify the economics of an investment in CCS. It is this incentive that has driven investment in CCS technology for emitters covered under Alberta's TIER program. A similar regulatory incentive is necessary in Ontario for covered emitters to monetize their CCS investments.

Creating a CCS offset protocol

The EPS amendments described above would help incentivize covered facilities. An additional incentive is also necessary for proponents of CCS projects outside of the EPS-covered sectors. Ontario's EPS program does not currently have a carbon offset system, whereby voluntary carbon abatement projects could be undertaken in accordance with approved methodology to generate offset credits, which could then be sold to covered emitters for compliance purposes. We recommend that the MECP consider developing an offset system, with a specific CCS offset protocol, at the earliest opportunity.

The absence of an offset system for the EPS is at odds with other carbon pricing regimes for large industrial emitters, such as the federal OBPS and the Alberta TIER program, each of which allow certified offset credits to be used for compliance purposes. Ontario's former cap-and-trade system also authorized offset credits, and several protocols were under development at the time of that program's cancellation.

There are already several well-recognized offset protocols for CCS projects that could be adapted for the Ontario EPS. For example:

- The Alberta TIER program has an offset quantification protocol for CO2 Capture and Permanent Storage in Deep Saline Aquifers;[23]
- The American Carbon Registry has a voluntary offset Greenhouse Gas Emissions Reduction Methodology for Carbon Capture and Storage Projects in the U.S. and Canada;[24] and
- The California Low Carbon Fuel Standard ("LCFS") has a Carbon Capture and Sequestration Protocol that generated compliance credits for the LCFS.[25]

These established offset protocols can be readily adapted for Ontario. With such an offset system and protocol in place, CCS project proponents would have a significant incentive (through the long-term generation of offset credits – typically over 10-20 year horizons) to invest in CCS projects. Importantly, this incentive must be available to proponents that are not covered emitters under the EPS. The EPS only covers those facilities with GHG emissions over 50,000 tonnes per year. An offset program with a CCS protocol is necessary to incentivize the deployment of CCS projects outside this group of covered emitters.

As the carbon charge rises, and CCS costs are reduced via economies of scale, the business case for CCS will improve, but only if the correct regulatory incentives are first established under the EPS.

Addressing post-closure responsibilities

The question of post-closure responsibility for stored CO2 has been considered extensively in the context of CCS projects. In practice, according to Professor Nigel Bankes at the University of Calgary, "[v]arious government reports and policy frameworks have advocated for a transfer of responsibility [to the Crown], either to assure the public that there will be a responsible entity even if the operator becomes insolvent or

[23] Alberta Government, Quantification Protocol for CO2 Capture and Permanent Storage in Deep Saline Aquifers (June 23, 2015).
[24] American Carbon Registry, Methodology for the Quantification, Monitoring, Reporting and Verification of Greenhouse Gas Emissions Reductions and Removals from Carbon Capture and Storage Project, version 1.1 (September 2021).
[25] California Air Resources Board, Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard (March 6, 2018).

simply disappears over the long time that CO2 is expected to be sequestered, or as an incentive to encourage CCS development."[26]

The CSA Code also contemplates that, at the end of CO2 injection, the project operator will use the post-injection period to prepare the site for the transfer of responsibility, with the intention of transferring all rights, obligations, and responsibilities associated with the site to a designated authority. When this occurs, the site is said to achieve "closure"[27], with a site achieving "regulatory or permitted" closure status at the point of transfer of responsibility.[28]

According to Professor Bankes, most jurisdictions have followed this approach, and most writers support the post-closure transfer of liability.[29] Alberta, for example, follows a post-closure transfer of liability approach like that described in the CSA Code. When enacting Part 9 of the MMA (i.e., the regime for Crown lease agreements for CCS projects in Alberta), specific provisions were included to ensure the long-term responsibility for stored CO2 would ultimately transfer to the province. Now, when the Alberta Energy Regulator ("**AER**") issues a license for a CO2 injection well, it makes the licensee responsible for the proper maintenance and abandonment of such a well. Under Part 9, the licensee may also enter into a lease agreement with the government of Alberta to inject captured CO2 into a subsurface reservoir.[30] The lessee can eventually apply for a "closure certificate" so long as it has complied with its monitoring, abandonment and reclamation obligations, and there is no significant risk of future leakage.[31] Once a closure certificate is issued, the Crown becomes the owner of and liable for the captured CO2. There are equivalent processes in other jurisdictions. For example:

> The EU CCS Directive[32] provides a set of conditions for transfer of liability which the member states must implement within their national legal systems. After injection finishes as planned, the site is closed and the post-closure monitoring period commences. After 20 years or less, if the site is stable, the private operator can request transfer of responsibility to the state. Specifically, after a storage site has been closed, Article 18, section 1 of the Directive provides that the transfer of responsibility to the state (on the state's own initiative or on request by the operator) must occur if the available evidence indicates that the stored CO2 will be completely and permanently contained.

Under North Dakota's State Code Chapter 38-22 (CO2 Underground Storage), section 38-22-17, the operator can apply to the state's Industrial Commission for a certificate of project completion, after CO2 injections into a reservoir end. The certificate may not be issued until at least ten years after CO2 injections end, and requires evidence that the storage reservoir is stable.

Under Australia's federal Offshore Petroleum and Greenhouse Gas Storage Act 2006, a CCS project may only be decommissioned after a site closing certificate is granted by the Commonwealth to the GHG injection licensee. After the closure assurance period has occurred, the Commonwealth will indemnify the GHG injection licensee against any liability in relation to the formation.
Further information on these regulations is included in Appendix A.

Enbridge strongly recommends that a liability transfer regime like the one under Part 9 of the MMA be adopted for Ontario. This transfer of responsibility should be available to all CCS projects permitted under the OGSRA. It should also be a standard provision in every permanent storage lease for CO2

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[26] Bankes, N., Alberta's approach to the transfer of liability for carbon capture and storage projects', Int. J. Risk Assessment and Management, Vol. 22, Nos. 3/4 (2019), at p 313.

[27] "Site closure" is defined as the point within a closure period when the site has met the "specified requirements of the regulatory authority such that the post-closure stewardship and monitoring responsibility can be transferred to the designated authority". See: CSA Standard Z741-12 (Geological storage of carbon dioxide).

[28] See s. 9.2, note 1.

[29] *Supra* note 26.

[30] Alberta *Mines and Minerals Act* (MMA), s. 116.

[31] MMA, s. 120(3).

[32] European Union, Directive 2009/31/EC.

sequestration on Crown lands that is issued under the *Mining Act*, as it is for CO2 sequestration leases issued under Alberta's MMA. To support this approach, Enbridge would also be amenable to the establishment of a Post-Closure Stewardship Fund, like the one developed in Alberta, whereby CCS operators would contribute to a fund for any post-closure liabilities. See Appendix A for additional information on the Alberta approach.

This approach creates a critical incentive for CCS proponents; without it, investors may not invest in CCS projects, or may price in the long-term liability risk in a manner that makes certain projects uneconomical. Moreover, this transfer of liability provides the public assurance that, decades into the future, the province will be able to manage any long-term responsibilities especially where the existence of corporate entities over that same time horizon is less clear.

Recommendations

Enbridge recommends that the government:

- Amend the EPS to allow CO2 that is captured from a covered facility and appropriately sequestered to be deducted from a covered facility's verified emissions;
- Create a carbon offset system in connection with the EPS and develop a project methodology for CO2 sequestration that would allow offset credits to be issued to voluntary CCS projects that take place outside the covered sectors; and
- Ensure there is an appropriate transfer of long-term responsibilities for stored CO2, following the model established in Alberta.

5. Ensuring Scalable and Cost-Effective Infrastructure

Provided that a robust permitting regime, and the correct regulatory incentives, are established for CCS in Ontario, there may soon be a need to scale up the province's CCS infrastructure to meet demand. Any short-term regulatory amendments should therefore be a step towards facilitating not only a few discrete projects, but also a broader network of CCS infrastructure. As that infrastructure is deployed, attention should be given to ensuring it remains cost-effective for all users.

Ensure broad opportunities

In designing a new regulatory framework for CCS in Ontario, it will also be important to look ahead to ensure the regime can support the scaling up of CCS infrastructure over time. Although we appreciate the Ministry's consideration of specific agreements for proponents of test, pilot or demonstration projects, experience in other jurisdictions has shown that once regulatory barriers are removed, and once proper incentives are put in place, the demand for CCS quickly accelerates.

For example, in 2011, the Alberta government decided to subsidize four CCUS projects:

- Shell's Quest facility (which is also a registered offset project under Alberta's TIER program);
- Enhance's Alberta Carbon Trunk Line;
- TransAlta's Pioneer project, for which Enbridge was a partner; and
- Swan Hill Synfuels' project.[33]

Today, Alberta has identified a significant demand for an extensive network of CO2 pipelines and disposal facilities in order to support CCS across the province. Last year, Alberta launched an request for

[33] The first two were constructed and in operation. The latter two did not proceed due to a lack of financial viability.

proposal (RFP) for sequestration hub operators, with the intention of issuing final agreements for sequestration hubs under the MMA. Further information on these agreements is available in Appendix A.

With the escalating price of carbon in Canada making new CCS increasingly economically viable (provided CCS can be used by covered emitters to reduce their verified emissions), we expect that the transition from individual projects to more comprehensive CCS infrastructure will occur more rapidly in Ontario than it did in Alberta, as long as the appropriate regulatory regime is in place. We encourage the government to ensure that any regulatory amendments designed to facilitate an initial set of CCS projects can be leveraged in the future to approve more extensive CCS infrastructure.

Ensure cost-effectiveness

Transitioning to a low carbon economy will be expensive. If the costs of implementing CCS projects are too high, it will be a barrier to adoption, and EITE industries and the Ontario economy will not realize the full benefit of the technology. To help ensure faster adoption and deeper market penetration of CCS technology, any new regulatory regime needs to be structured in a way that helps keep costs reasonable for Ontario while still ensuring public safety.

There are several ways in which the government can help maintain the cost-effectiveness of a CCS regime. The Alberta regime does not provide for the rate regulation of CO2 pipelines.[34] Commentators have suggested that common carrier obligations (such as open access to third parties and non-discriminatory rates) and light-handed regulation on a complaint basis is the best approach for such pipelines. As a result, the Alberta Carbon Trunk Line ("**ACTL"**) is not rate regulated in Alberta. Rather, the ACTL is subject to a CCS Funding Agreement with the Government of Alberta[35] that requires the owner/operator of the pipeline to offer open access, not unjustly discriminate, and charge just and reasonable tolls. Tolls are to be cost-of-service based where the owner/operator is entitled to earn a rate of return on such costs in accordance with industry standard rates of return for oil and gas and other products pipelines in the oil and gas industry.[36]

Alberta will likely impose similar obligations on agreement holders for carbon sequestration hubs. The RFP guiding document states that such holders will have an obligation to enable open access to parties subject to fair and reasonable cost recovery in providing: carbon sequestration services; and access by a third party to sequestration pore space within the location to undertake injection.37

Enbridge supports this approach for Ontario. We are supportive of the "open access" CO2 transportation and sequestration service provider model and Enbridge has decades of experience providing services in this manner throughout North America. The vast majority of Enbridge's North American operations are based upon a "utility like" economic model – charging rates that recover costs and a relatively low rate of return on equity deployed (similar to gas distribution).

Recommendations

Enbridge recommends that the Government:

- Ensure that any regulatory amendments designed to facilitate an initial set of CCS projects can be leveraged in the future to approve more extensive CCS infrastructure, as Alberta is doing under the MMA; and

[34] These pipelines are not deemed to be a common carrier or a gas utility under the Oil and Gas Conservation Act and the Gas Utilities Act, respectively

[35] Alberta Department of Energy, Carbon Capture and Storage Program - Full Project Proposals Information Package (December 2008).

[36] *Ibid*. See sections 3.5, 3.6, and 3.8 of the CCS Funding Agreement.

[37] Government of Alberta, Request For Full Project Proposals For Carbon Sequestration Hubs (December 2, 2021).

- Design the regulatory regime for CCS projects to minimize costs, while still ensuring public safety, in part by adopting open access policies to third parties and non-discriminatory rates, as is being done in Alberta.

Conclusion

Enbridge is glad to see Ontario moving forward to remove the regulatory barriers to CCS in Ontario and to develop a new regulatory regime to permit these projects. Given the policy momentum in favour of CCS projects, and the rapidly growing need for CCS to facilitate the energy transition, Ontario must move quickly with these regulatory changes. Fortunately, recently enacted amendments to Ontario's OGSRA for CAES projects, and successful CCS-specific regulations in jurisdictions like Alberta, offer Ontario a path forward so that we can bring the environmental and economic benefits of CCS technology to the province in a timely fashion. We appreciate the opportunity to submit these comments and encourage the government to adopt the recommendations we have set out above. If you have any questions or require additional information please do not hesitate to contact Nicole Gruythuyzen, Government Affairs Senior Advisor (nicole.gruythuyzen@enbridge.com).

APPENDIX A

Addressing Post-Closure Responsibilities

Under Part 9 of Alberta's *Mines and Minerals Act* ("**MMA**"), the holder of a carbon dioxide storage lease can eventually apply for a "closure certificate" so long as it has complied with its monitoring, abandonment and reclamation obligations and there is no significant risk of future leakage. Once a closure certificate is issued, the Crown becomes the owner of and liable for the captured carbon dioxide. In particular, the Crown:

- assumes the obligations of an owner or licensee under the *Oil and Gas Conservation Act* for the wells and facilities covered by the agreement;
- assumes the obligations of the person responsible for injected captured carbon dioxide under the *Environmental Protection and Enhancement Act*, including responsibility as the operator in respect of the land used by the lessee in relation to the captured carbon dioxide;
- assumes the obligations under the *Surface Rights Act*; and
- indemnifies the lessee from liability in tort for claims brought forward by another party in relation to the captured carbon dioxide.

Alberta has also launched an RFP for sequestration hub operators, with the intention of issuing final agreements for sequestration hubs under the MMA. Those agreements would include a requirement to contribute to a Post-closure Stewardship Fund. In particular, the agreements are expected to require the following:

- Agreement term of 15 years (renewable through application).
- Obligations to pay into the Post-closure Stewardship Fund (for all carbon dioxide injected into the Location, including by a third party).
- Measurement, monitoring, and verification planning and reporting (for all carbon sequestration activities occurring in the Location, including third party).
- An initial and updated closure plan.

Similarly, under Article 18, Section 1 of the EU CCS Directive, after a storage site has been closed, the Directive provides that the transfer of responsibility to the state (on the state's own initiative or on request by the operator) must occur if:

- all available evidence indicates that the stores carbon dioxide will be completely and permanently contained;
- a minimum period (to be determined by the competent authority, but no shorter than 20 years, unless the competent authority is convinced that the criterion immediately above is complied with before the end of that period;
- the financial obligations referred to in Article 20 of the Directive have been fulfilled; and
- the site has been sealed and the injection facilities have been removed.

Under North Dakota's State Code Chapter 38-22 (Carbon Dioxide Underground Storage), section 38-22-17, the operator can apply to the state's Industrial Commission for a certificate of project completion, after carbon dioxide injections into a reservoir end. The certificate may not be issued until at least ten years after carbon dioxide injections end, and unless the operator:

- Is in full compliance with all laws governing the storage facility.
- Shows that it has addressed all pending claims regarding the storage facility's operation.
- Shows that the storage reservoir is reasonably expected to retain the carbon dioxide stored in it.
- Shows that the carbon dioxide in the storage reservoir has become stable. Stored carbon dioxide is stable if it is essentially stationary or, if it is migrating or may migrate, that any migration will be unlikely to cross the storage reservoir boundary.
- Shows that all wells, equipment, and facilities to be used in the postclosure period are in good condition and retain mechanical integrity.
- Shows that it has plugged wells, removed equipment and facilities, and completed reclamation work as required by the commission

Issuance of the certificate means:

- Title to the storage facility and to the stored carbon dioxide transfers, without payment of any compensation, to the state.
- Title acquired by the state includes all rights and interests in, and all responsibilities associated with, the stored carbon dioxide.
- The storage operator and all persons who generated any injected carbon dioxide are released from all regulatory requirements associated with the storage facility.
- Any bonds posted by the storage operator must be released.
- Monitoring and managing the storage facility is the state's responsibility to be overseen by the commission until such time as the federal government assumes responsibility for the long-term monitoring and management of storage facilities.

Under Australia's federal *Offshore Petroleum and Greenhouse Gas Storage Act 2006*, a CCS project may only be decommissioned after a site closing certificate is granted by the Commonwealth to the GHG injection licensee. In order to obtain a certificate, the licensee must model the behavior of the GHG substance injected (including its expected migration pattern and the short-term and long-term consequences of the substance on geotechnical integrity, human health or safety or the environment), and propose an approach for the Commonwealth to take in monitoring the GHG storage formation. The licensee must provide security for the proposed program of monitoring operations. The Commonwealth can recover from the licensee any reasonable costs or expenses incurred in carrying out the program. If the Commonwealth is satisfied that the greenhouse gas is behaving as modeled and there is no significant risk of major impact on geotechnical integrity, human health or safety, or the environment, the Commonwealth may declare that a closure assurance period has occurred. After issuing the declaration, the Commonwealth will indemnify the greenhouse gas injection licensee against any liability in relation to the formation. The closure assurance period must be a minimum of 15 years.