Enbridge Feedback on Regulating Commercial-Scale Geologic Carbon Storage Projects in Ontario

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About Enbridge Gas Inc.

Enbridge Gas is Canada's largest natural gas storage, transmission and distribution company based in Ontario, with 2023 marking its 175th anniversary of serving customers. The distribution business provides safe, affordable, reliable energy to about 3.9 million customers and is innovating to contribute to a lower-carbon energy future. The storage and transmission business offers a variety of storage and transportation services to customers at the Dawn Hub, the largest integrated underground storage facility in Canada and one of the largest in North America. Enbridge Gas is owned by Enbridge (ENB), a Canadian-based leader in energy transportation and distribution.

Learn more at www.enbridgegas.com.

Introduction

Enbridge Gas Inc. and its affiliated companies (Enbridge) commend the Government of Ontario (Government) for taking steps towards designing a regulatory framework for commercial-scale geologic carbon storage projects in Ontario. This framework would enable the development of technology-ready commercial-scale projects and the continued testing and demonstration of newer carbon storage technologies. Enbridge also appreciates the opportunity to submit feedback on the Government's July 2024 *Discussion Paper: Regulating Commercial-Scale Geologic Carbon Storage Projects in Ontario* (Discussion Paper). That feedback forms the basis of this submission.

Executive Summary

Ontario's roadmap toward regulating geologic carbon storage is missing a fundamental component of the requisite regulatory framework. This omission causes uncertainty for the development of commercial-scale CCS, starting with testing and evaluation projects, which are referred to as Special Projects in regulations (O. Reg. 425/23) introduced under the *Oil, Gas and Salt Resources Act* (OGSRA) on January 1, 2024. Specifically, clarity around pore space ownership and established boundaries of a Special Project location is required for the timely, safe and efficient development of commercial-scale carbon sequestration hubs. Enabling and approving Special Projects for the right to drill wells, conduct evaluation and testing, and establish monitoring baselines must accompany the rights to a surface area and subsurface pore space for commercial-scale project development. Pore space rights provide certainty for project proponents to invest and enable hub-scale project development, providing access to multiple emitters, creating economies of scale and lowering capital costs. The following responses to questions posed in the Discussion Paper highlight the immediate need for pore space vesting and awarding pore space rights (or a path to obtaining pore space rights) as well as established project boundaries at the Special Project designation stage of the regulatory framework.

Recommendations

The recommendations summarized below would help create a framework for commercialization that fosters public confidence and supports and meets the needs of hard-to-abate emitters.

1. Vest and declare ownership of all Cambrian reservoir and depleted reservoir pore space for geologic carbon storage to reinforce public confidence in the Government's commitment to ensuring the safe and efficient management of this scarce and strategic resource.
2. Merge the public and private land processes to optimize the development of Ontario's finite pore space.
3. Expedite the issuance of the commercial-scale framework to ensure Ontario becomes an eligible jurisdiction for federal Investment Tax Credits (ITCs).
4. Consider implementing a provincial tax incentive program to stack with federal ITCs, similar to the Alberta Carbon Capture Incentive Program and Saskatchewan's Oil Infrastructure Investment Program.
5. Issue a request for proposal (RFP) to solicit proposals for open-access carbon capture and storage (CCS) hub projects and evaluations. The RFP should include a path to transition successful evaluation projects into commercial-scale projects with sole rights to pore space

within the project boundary, contingent upon meeting all technical, safety and regulatory requirements.

6. Take a "whole of Government approach" to recognize that a carbon capture and storage (CCS) storage facility will also require significant investment by large emitters for CO2 capture that must be connected by pipelines, rail and/or truck. A "whole of Government" approach would provide clear coordination and planning across regulating bodies, leverage existing regulations and prevent duplication of processes, coordinate timing between agencies, and provide an efficient transportation and storage regulatory framework, which could be implemented as soon as possible.
7. Protect the entire storage complex, including storage formation(s) and caprock(s)/seal(s). Designating the entire storage complex for appropriate regulatory protection will guard against unwanted penetrations and minimize any possible leakage pathways.

Discussion Paper questions, comments and feedback

Below are Enbridge's submissions regarding the questions and comments set out in each section of the Discussion Paper, following which Enbridge addresses the nine questions included at the end of the Discussion Paper.

1. Introduction

Enbridge agrees that CCS is a significant opportunity, which could enable $94 billion in investments and contribute $218 billion to Ontario's GDP by 2050, create over 44,000 jobs annually, and grow Ontario's lower-carbon economy.[1] One commercial-scale CCS hub of at least 5 million tonnes of CO2/year could help Ontario and its hard-to-abate industries meet Ontario's 2030 GHG reduction goals.[2]

Geologic carbon storage is increasingly recognized as a safe and proven technology, operating in many jurisdictions worldwide for over 50 years. Canadian provinces, including Alberta, Saskatchewan, British Columbia, and recently Manitoba, have developed enabling legislative frameworks in support of commercial-scale geologic carbon storage. Lessons and best practices from other jurisdictions should be considered and, where appropriate, leveraged for Ontario. These best practices are discussed further below and notably include the provincial ownership and stewardship of subsurface pore space for the purposes of CO2 storage.

Enbridge has safely injected natural gas into geologic formations in Ontario for over 80 years. If this experience is combined with Canada's leadership in developing CCS and the existing technical standards for the geologic storage of carbon dioxide, potential risks associated with geologic carbon storage can be mitigated and managed safely in Ontario.

To foster the public's confidence in and acceptance of CCS, the Government needs to take a strategic role as the steward of all the pore space suitable for CO2 storage and implement policy that maximizes the development of the limited, useable pore space for CCS in Ontario.

[1] Canadian Centre for Economic Analysis, "Economic Contribution of CCS and H2 Investments in Ontario", https://www.cancea.ca/index.php/2023/10/24/economic-contribution-of-ccs-and-h2-investments-in-ontario/

[2] Ontario Emissions Scenario as of March 25, 2022 (prod-environmental-registry.s3.amazonaws.com)

There is broad industry support for this approach[3]. This can be most optimally achieved by enabling large regional-scale open-access commercial hubs to realize economies of scale, thereby reducing costs and making CCS economically viable for large emitters.

2. Ontario's phased approach to enabling geologic carbon storage

The Government has taken a phased approach to enabling and regulating geologic carbon storage in Ontario. This phased approach to separate evaluation projects from a commercial-scale regulatory framework has yet to provide clarity for businesses to make the significant investments needed in carbon sequestration projects in Ontario. By enacting Special Project regulations and potentially awarding Special Projects on private land before a commercial-scale framework is adopted, project proponents are missing a critical link to obtain the rights to pore space at the evaluation stage and set definitive project boundaries for the efficient development of geologic carbon storage. Pore space rights acquisition is a fundamental component of Ontario's (and other jurisdictions') CCS regulatory framework. For project proponents who may be awarded a Special Project designation, uncertainty on obtaining pore space rights over a defined area encumbers their investment in evaluation projects. This ultimately creates a significant risk to future commercial-scale projects seeking to develop commercial-scale CCS hubs. The commercial-scale framework must provide a path for designated Special Projects to obtain pore space rights and establish defined project boundaries at scale to support future commercial-scale hub development.

Alberta's CCS regulatory framework combined the evaluation and commercial-scale regulatory structure simultaneously. This resulted in investment certainty for project proponents, who could be confident that millions of dollars of evaluation infrastructure could be utilized over the useful life of a multi-decade project because sufficient pore space was awarded at the evaluation stage to enable a commercial-scale project. Alberta currently has 24 projects under development within the province[4].

The Discussion Paper states, "Carbon storage or sequestration activities that do not involve the use of wells to inject CO2 into geologic formations would not be subject to the new framework". CCS projects, standalone or hub-scale, will require transportation pathways to connect CO2 sources with geologic carbon storage facilities, likely using pipelines. A commercial-scale CCS framework needs to include regulations (or direction and timing for regulations) for carbon transportation along with commercial-scale geologic carbon storage. If commercial-scale geologic carbon storage regulations are not linked with regulations for CO2 pipelines, CCS projects will be delayed even further, risking investment opportunities and GHG reduction opportunities for Ontario. The Canadian Centre for Economic Analysis (CANCEA) report[5] on CCS and hydrogen investment in Ontario identified the significant cost of delays: "a 3-year delay is projected to result in a $52.7 billion decrease in total GDP contribution by 2050, and a 5-year delay could escalate this loss to $83.7 billion".

[3] Ontario Chamber of Commerce, June 26, 2024 Open Letter, https://occ.ca/wp-content/uploads/Open-letter-on-CCS-Vesting-in-ON.pdf

[4] Alberta's Carbon capture, utilization and storage – Carbon Sequestration Tenure, https://occ.ca/wp-content/uploads/Open-letter-on-CCS-Vesting-in-ON.pdf

[5] Canadian Centre for Economic Analysis, "Economic Contribution of CCS and H2 Investments in Ontario", https://www.cancea.ca/index.php/2023/10/24/economic-contribution-of-ccs-and-h2-investments-in-ontario/

3. Where should commercial-scale carbon storage be permitted to occur?

Enbridge submits that commercial-scale carbon storage should be permitted wherever it is safe and economical. Given Ontario's limited pore space, the province should not restrict the depth of commercial-scale CCS projects. A robust technical evaluation of the subsurface should determine the suitability of geologic carbon storage at any depth. Likewise, the potential for CO2 storage through mineralization, which is being explored at shallower depths, should not be hindered or discouraged with a minimum depth stipulation. In addition, the regulations should be drafted to enable future technologies to develop new geologic carbon storage solutions unrestrictive of depth.

The Discussion Paper cites a proposed limit of 800 meters below ground. This depth may have been proposed because it is sometimes cited[6] as sufficient depth to safely operate with an injection pressure to keep the CO2 in a dense phase. To keep CO2 in a supercritical phase, a temperature of at least 31 degrees C and a pressure of 1070 psi are needed.

There is insufficient data to determine if the Cambrian reservoir in Ontario will have the needed temperature in all regions at 800 meters subsurface to keep the CO2 in the supercritical phase. The Cambrian formation also dips, and CO2 injected below 800 meters subsurface may migrate up-dip to end up shallower than 800 meters subsurface.

Several depleted oil and natural gas reservoirs may be suitable for CCS in Ontario. However, few are deeper than 800 meters below the surface. Several Ordovician and Cambrian reservoirs are located below 800 meters sub-surface, but they are limited in capacity and suitability for CCS. Enbridge supports an Ontario policy that would see a path for these depleted reservoirs to be re-purposed for CCS if confirmed suitable from a technical and safety perspective, regardless of depth.

Technically, there is no reason CO2 cannot be safely stored as a gas (as would occur if the depth and pressure are not sufficient to maintain the CO2 in the dense phase). In areas of the world with reservoir options with depths of 800 meters subsurface or more, CCS projects often focus on deeper reservoirs simply to gain access to more storage capacity per volume of reservoir.

4. What type of commercial-scale projects would be developed?

Commercial-scale projects developed in Ontario should prioritize maximizing pore space utilization and lowering costs for large emitters by achieving economies of scale through open-access CCS hubs.

Enbridge's studies have shown that, depending on the geology, CO2 injected at a commercial well could extend up to 10 km in all directions over a period of 20 or more years. Similarly, the increased pressure in the reservoir will also rise and could be measured in a 20 km radius from the well. To keep the pressure influence of one commercial CCS project from negatively impacting a neighbouring project, a buffer area will be required around each project. The buffer area would then become "sterilized" and unavailable for carbon storage. For this reason, Enbridge strongly recommends that the commercial-scale framework focus on enabling the development of large open-access CCS hubs and refrain from facilitating smaller standalone

[6] Geological Sequestration of Carbon Dioxide: A Technology Review and Analysis of Opportunities in Ontario - https://web.archive.org/web/20230804040753/http://www.climateontario.ca/MNR_Publications/276925.pdf See also https://www.netl.doe.gov/carbon-management/carbon-storage/faqs/carbon-storage-faqs

projects that would create more buffer zones and result in the inefficient use of the finite amount of pore space within the province.

All commercial-scale projects will require well-defined areas or boundaries that are sufficient in size to accommodate enough injection wells to achieve economies of scale. The boundaries must also be far enough apart that they do not negatively interfere with each other (approximately 5 to 10 km apart). There will also need to be a sufficient boundary or protection zone to eliminate interference with any neighbouring project (or the international boundary, in the case of projects near the Canada-U.S. border).

The average size of an evaluation project in Alberta is 5,000 km2. The map of all approved Alberta evaluation projects is available online[7]. Project areas of this magnitude are required to develop open-access hubs in Ontario and will overlap both land and water, on private and Crown land. For this reason, the commercial-scale framework must merge access to both private and Crown land pore space to treat it as an integrated asset after the pore space is vested in the Crown.

5. How should commercial-scale projects be authorized?

Enbridge supports a policy that authorizes commercial-scale projects based on a rigorous safety threshold, financial solvency requirement and competency review before a proponent would be awarded the right to evaluate an area. Such a policy would ensure project viability, regulatory compliance, environmental responsibility and community trust.

Enbridge supports a competitive process, similar to Alberta's carbon sequestration tenure process, to award pore space evaluation rights over specific blocks of land that include both private and Crown land. Enbridge proposes that the Government take the following steps to enable a successful long-term commercial-scale geologic carbon storage framework:

1. Vest and declare ownership of all Cambrian reservoir and depleted reservoir pore space for geologic carbon storage.
2. Enable access and right-of-entry to both private and Crown land for Special Project evaluation and commercial-scale development.
3. Provide a path for Special Projects designated by the Minister to acquire pore space.
4. Initiate a call for additional Special Projects using a curated RFP process designed by technical experts at the Ministry of Natural Resources (MNR).
5. Determine technical requirements to approve commercial-scale projects.
6. Determine reporting requirements for operational CCS hubs.
7. Enable regulations to build and operate CCS pipelines and other transportation methods such as truck, rail and ship.
8. Define time period, processes and other requirements for transferring long-term liability for eligible CCS projects back to the Crown.

Carbon storage projects need associated infrastructure, like pipelines, to make commercial-scale projects operational. The regulation of CO2 pipelines and associated infrastructure upstream of the wellhead must be enacted alongside commercial-scale geologic carbon storage. Enbridge recommends a “whole of Government” approach to review and approve different CCS project components efficiently, as defined in the recommendations above.

[7] https://geospatial.alberta.ca/portal/apps/webappviewer/index.html?id=78b2a72e89b3450f84e153120c2d97b8

6. How should special projects be transitioned into the commercial-scale framework?

Special Projects should be approved and designated with a path to reach commercial-scale after technical due diligence is completed and reviewed by MNR. The Special Project and commercial-scale frameworks must be integrated into one seamless process. As highlighted above, pore space ownership and control and defined boundaries for Special Project evaluation need to be determined. In addition, the following issues need to be resolved:

1. The current Special Project application and approvals process allows for two competing CCS project proponents to obtain Special Project designation and drill evaluation wells in close proximity. However, commercial projects will need a defined project boundary to evaluate, award capacity, operate, monitor, and close out. The project boundaries need to be of adequate size to convert to a commercial-scale hub and be separated from each other.
2. The areal extent of "evaluation rights" needs to be addressed. Without provincial ownership of pore space and an approved process for awarding the pore space to a proponent for evaluation, the project boundary required if/when an evaluation project advances to the commercial project phase may not be available. Project proponents are currently carrying this investment risk for evaluation projects.
3. There is currently no public transparency on Special Projects, including where, who, and what they are approved for. Enbridge recommends that Ontario adopt a process similar to Alberta, where CCS project proponents apply for and obtain exclusive evaluation rights over large blocks or areas. Once awarded, this information is made public. For example, the map of all approved Alberta evaluation projects is available online[8].

7. How should proponents obtain rights to pore space?

Enbridge recommends that Ontario first take control of all pore space potentially suitable for CO2 storage. This means vesting the ownership of pore space in the provincial Crown (as Alberta[9] has done, and Manitoba is planning[10]) or effectively controlling it (as British Columbia has done). Once there is clarity regarding private land pore space in Ontario and given that the Crown already controls the majority of the Cambrian pore space suitable for CO2 storage under the Great Lakes, the province then becomes the holder of all relevant pore space rights.

Ontario should then follow the Alberta model and issue a comprehensive RFP for pore space evaluation projects to award the most qualified proponents exclusive evaluation rights to certain areas that will maximize the benefits to Ontario. CCS project proponents would identify proposed areas to evaluate, potentially covering private and Crown land areas. Ontario would award projects based on merit (following the Alberta RFP model[11]) and successful proponents would then be granted exclusive rights to evaluate those areas. Subject to a successful evaluation and application process for a commercial project, the evaluation lease for that area would then be converted to a commercial lease for the same area.

In the case of depleted oil and natural gas reservoirs that may be technically suitable for carbon storage, Enbridge supports a policy where there is a path for these reservoirs to be evaluated

[8] https://geospatial.alberta.ca/portal/apps/webappviewer/index.html?id=78b2a72e89b3450f84e153120c2d97b8

[9] Section 15.1 of the Mines and Minerals Act

[10] The Captured Carbon Storage Act (gov.mb.ca)

[11] https://www.alberta.ca/system/files/custom_downloaded_images/energy-request-for-full-project-proposals-rfpp-guidelines.pdf

and potentially converted to carbon storage. Many of these reservoirs may have lease agreements that would be in conflict for conversion to carbon storage (for example natural gas storage leases or compressed air energy storage leases). Ontario needs to ensure that existing rights holders are not negatively impacted by a CCS proponent attempting to convert these depleted hydrocarbon reservoirs to CCS.

Why should Ontario vest or control suitable pore space?

For CCS to be successful in Ontario, it must be both generally accepted by the public as a societal good to reduce greenhouse gas emissions and economically viable for large emitters.

Public acceptance may be easier to attain if the public sees the province exercising effective stewardship and control over the finite pore space under both private and public lands to ensure public safety, adhere to best practices and maximize benefits for Ontarians.

For CCS to be economically viable in Ontario, the costs need to be competitive relative to other jurisdictions. Otherwise, hard-to-abate, Energy Intensive, and Trade Exposed (EITE) sectors like steel, cement, fertilizer, and refineries are at risk of leaving the province. Economies of scale are required to achieve lower costs by building large-scale projects to lower per-unit costs. This also means ensuring a competitive pore space rental rate. In Alberta, CCS proponents pay an evaluation lease fee of $1/hectare per year[12]. Enbridge recommends a similar or comparable rate for Ontario.

If pore space is not vested, potential CCS project developers will require signed agreements with hundreds or possibly thousands of landowners. They will also require a mechanism for forcing unitization of land over CO2 storage areas that (unlike traditional oil and gas reservoirs) will continue to grow and expand during the injection phase of a project. This will likely lead to speculators and holdouts, both of which will drive up costs and cause delays.

Why does the natural gas storage model not work for CCS?

The Discussion Paper suggests “Ontario could also consider modeling its approach after the process and requirements in place for natural gas storage projects.” Below we contrast natural gas storage with geologic carbon storage, to demonstrate that the gas storage model is not appropriate for CCS. Notably, a key factor is the much larger geographic areas covered by one-time carbon storage – and thus, the number of landowners to negotiate with, if individual agreements are required – versus cyclical gas storage that is injected and withdrawn within the same operating year.

Enbridge has been developing and operating natural gas storage in Ontario since the 1940’s. Each reservoir is a well-defined, sealed “container” that is bounded or covered by impermeable cap rock. The size and shape of the reservoir or container does not grow or change over time. These formations were discovered containing natural gas or some oil with natural gas, and then produced over time. Typically, the petroleum and natural gas (PNG) rights were leased to a hydrocarbon production company (with the landowner receiving royalty). In many cases, the landowner also signed a Gas Storage Lease Agreement (GSLA), entitling the landowner to annual compensation based on how many acres of their land were within or surrounding the Designated Gas Storage area (DSA). The *Ontario Energy Board Act* includes requirements regarding this type of compensation in section 38(2).

[12] Section 21 of Carbon Sequestration Tenure Regulation

Additionally, the annual value of natural gas storage is derived and reflected in the summer-winter price differential of natural gas. Natural gas is generally injected each summer (when gas prices are generally lower) and withdrawn in the winter (when gas prices are generally higher). Since "value" is created with each injection and withdrawal cycle, natural gas storage projects can afford to make ongoing annual payments to natural gas storage rights holders. When natural gas storage projects are being developed, the proponent will seek to enter into GSLAs with all rights holders over the known area of the reservoir. The areal extent of the reservoir is well understood and relatively small. To protect the natural gas storage formation, there is a buffer zone around each DSA of 1.6 km that prevents any subsurface activities that may compromise the integrity of the storage zone. There are 34 active natural gas DSAs in Ontario covering a collective 141.5 km^2. The largest is Kimball-Colinville, at 19.2 km^2 and the smallest is St. Clair, at 1.24 km^2. The average size is 4.2 km^2. Most of the DSAs are in Lambton County and all are operated by Enbridge Gas. Enbridge Gas has approximately 1,000 GSLAs for the lands in and around the 141.5 km^2 – for an average of 7 GSLAs per 1 km^2.

The compensation paid to landowners under the existing GSLAs in Ontario is well over 200 times as much as the rates CCS project proponents pay to the crown in Alberta. If Ontario CCS projects are required to incur lease costs more than the Alberta regime it will threaten the economic viability of CCS projects in Ontario and will put the future of the EITE sector in the province at risk. CCS projects are extremely low-margin, low-return businesses, and high lease costs in Ontario would render an undue economic burden for investment in commercial-scale CCS.

There is a process, under the OGSRA, to unitize production reservoirs, as well as to expropriate storage lease rights in the event of a holdout from a natural gas storage project rights holder.

Contrast this with carbon storage:

1. Commercial carbon storage will be a one-time use of the pore space. No annual or recurring value will be created. Any incremental or recurring payment for pore space access will increase the cost of carbon storage for the large emitter customer.
2. Unlike natural gas storage in a geological trap (with finite boundaries), the areal extent of a CO2 injection plume in a regional Cambrian reservoir, with significantly broader boundaries, will grow over time. The landowners in the immediate vicinity of the injection well will hold the majority of lands over the CO2 plume in the early years and a minority in the longer term. This makes unitization impossible as the plume's overall size continually grows over the life of the injections. Enbridge's preliminary modeling suggests that over a 20-year or more injection period, the CO2 plume could extend from 5 to 20 km out radially from each injection well, and many injection wells will be required to achieve economies of scale.
3. In Alberta, there are 97,000 km^2 of CCS evaluation leases[13] with an average size of 5,125 km^2. The province has set an evaluation lease rate of $1.00/ ha per year[14] (about $0.40/acre per year) payable to the province.
4. Ontario has two Cambrian reservoir regions that may be suitable for CCS. One is along the shores of Lake Erie and Lake St. Clair (about 24,000 km^2) and another potential area is along the shore of Lake Huron (5,000 to 9,000 km^2). Since Ontario's Cambrian reservoir is shallower and thinner, to achieve economies of scale Ontario will likely

[13] https://geospatial.alberta.ca/portal/apps/webappviewer/index.html?id=78b2a72e89b3450f84e153120c2d97b8

[14] https://www.alberta.ca/release.cfm?xID=302889DAAB79F-0A5B-1418-BA33BB135909F2D8

require blocks of pore space at least as large as the Alberta average – in the range of 5,000 to 8,000 km^2 each.

5. The number of landowners over the potential Cambrian aquifer pore space is orders of magnitude larger than for natural gas storage, and as such, a different approach is required.

8. How should proponents gain surface rights, or any other rights required for their project?

Enbridge submits that there needs to be a clear articulation of what rights are required.

Enbridge has significant experience negotiating and securing surface rights for natural gas facilities such as pipelines, compressor stations, gate stations and customer stations from private landowners. Enbridge proposes this is an appropriate model for future carbon storage surface rights.

Currently, most municipalities in southwestern Ontario have natural gas franchise agreements with Enbridge or another gas utility. These agreements allow the franchise owner to build natural gas pipelines within municipal road allowances. These agreements do not cover CO2 pipelines, which will be required to connect large emitters to carbon storage sites and to connect multiple injection wells in a hub. Enbridge expects to negotiate with each municipality to secure the ability to build CO2 pipelines within road allowances.

In the rare case where a CCS proponent is unable to finalize a required agreement, the option to pursue the matter with the Ontario Land Tribunal for determination should be available.

9. How should proponents notify and engage with Indigenous communities and other potentially affected parties?

Ontario has well-established processes that can be leveraged to create a process to notify and engage Indigenous communities and other potentially affected parties, including through the existing OEB Environmental Guidelines and the Ontario Pipeline Coordinating Committee. Additionally, O. Reg. 425/23 has detailed requirements regarding the notification of impacted parties.

Enbridge also has an Indigenous Reconciliation Action Plan[15] that details our commitment to meaningful reconciliation within the communities where we work and live. Enbridge has a strong track record of engaging with Indigenous communities across North America over many years, about our projects and operations. That includes building relationships, creating economic opportunities, working to maximize benefits, and incorporating feedback into our plans and designs. Enbridge is committed to this approach for all of our projects, including CCS.

10. What level of financial assurance should be provided by proponents?

The amount of financial assurance required of a project proponent should be commensurate with the scale of the proposed activity, the likelihood of potential risks, and the legal entity's financial strength. These requirements could be evaluated regularly to monitor the proponents' creditworthiness and ensure the financial assurances are appropriate over time.

[15] Enbridge Indigenous Reconciliation Action Plan here: https://author.enbridge.com/reports/2022-indigenous-reconciliation-action-plan/why-an-indigenous-reconciliation-action-plan

11. How should the province provide oversight of carbon storage projects?

The province should continue to regulate geologic carbon storage, including the commercial-scale framework, through amendments to the Oil, Gas and Salt Resources Act and provide oversight from the Ministry of Natural Resources. Commercial-scale regulations should also adhere to the CSA Z741 Standard.

The province must also provide oversight for carbon transportation projects to connect geologic carbon storage projects to sources of CO2 emissions. The province can amend the Oil, Gas and Salt Resources Act to include carbon dioxide as a substance approved for transportation under the pipeline definition and adhere the act to the CSA Z662 Standard that already governs the use of pipelines to transport carbon dioxide. In addition, the TSSA amended its Fuels Safety Program for Oil and Gas Pipeline Systems Code Adoption Document Amendment[16] to include adding carbon dioxide pipeline systems as a public safety regulator.

12. How should projects be closed following the completion of injection activities?

CSA Z741 should be used as the standard for the closure phase of the CO2 storage project. CSA Z741 suggests that a closure period should be initiated upon cessation of injection activities, and the Closure Plan located within the Monitoring, Measurement and Verification (MMV) Plan should be implemented. During the closure period, monitoring will continue to ensure the conformance of the sequestered CO2, while facilities and wells not required for monitoring purposes are abandoned and reclaimed.

In Alberta, after all site closure activities have been completed and it is demonstrated that the CO2 plume has become stable, the project operator will be released from liability associated with the CO2 project and the Alberta Government will assume long-term liability. The Alberta Government will assume the long-term liability and obligations relating to wells, facilities, and sequestered CO2 for CCS projects following the issuance of a closure certificate. The transfer of responsibility from the operator to the Government is facilitated in exchange for a low-cost, risk-informed $/tonne fee levied each year of project operation. The fees are collected in a Post-Closure Stewardship Fund and used to address any issues that arise post-closure. Enbridge recommends that Ontario adopt a Post-Closure Stewardship fund to support the transfer of responsibility from the project operator to the Government post-closure.

Alberta's Directive 065 (Appendix P) outlines their requirements for closure. Enbridge proposes that Ontario adopt a similar process and guidelines.

13. How should closed projects be monitored and maintained over the long-term?

Closed projects should be monitored and maintained in accordance with the national standard for geologic carbon storage, CSA Z741, by the MNR. As discussed above, the fees collected over each year of the project life in a Post-Closure Stewardship Fund should be sufficient to monitor and maintain the project post-closure. Given the due diligence requirements to technically close out a CCS project, long-term monitoring and maintenance costs are expected to be minimal.

[16] https://www.tssa.org/sites/default/files/2024-08/Oil-%26-Gas-Pipeline-Systems-CAD-FS-253-24-Fuels-CAD.pdf

14. What other charges and fees should proponents be required to pay?

Ontario has a well bond requirement for each well drilled in Ontario that could be modified to include CCS wells. These bonds are held in place until the Ontario Government releases them upon completion of plugging and reclamation activities.

Enbridge supports a low, risk-informed Post-Closure Stewardship Fund fee to help fund the assumption of long-term liability.

15. How should the framework be delivered?

The framework should be delivered completely and fully transparent. It should merge Special Project regulations with commercial-scale regulations, including long-term liability and post-closure regulations. The regulations must also clarify private land pore space ownership and cover public and private land. The regulations should be clear, robust, and achievable, to enable commercial-scale CCS as soon as possible.

The framework must be sufficiently robust to make Ontario eligible for the federal Government investment tax credits for CCS. Ontario should consider provincial financial instruments to support CCS projects, modelled after Alberta's Carbon Capture Incentive Program (ACCIP) and Saskatchewan's Oil Infrastructure Investment Program.

The framework must also be delivered in a manner that provides Special Projects currently designated by the Minister a path to acquiring pore space rights.

Questions

1. **Would initially scoping the framework to only allow commercial-scale projects to store CO2 within saline aquifers and depleted oil and gas wells in southwestern Ontario at depths of at least 800m or more meet industry's current needs and maintain public comfort in the development of these projects?**

   Enbridge supports enabling commercial-scale projects to store CO2 within saline reservoirs and depleted reservoirs without placing a depth restriction on storage. CCS proponents want to maximize the amount of CO2 that can be permanently stored, and any technically suitable storage reservoir and safe depth should be considered based on the technical due diligence of the evaluation project.

   Additional comments concerning a depth minimum are provided in Section 3 above.

2. **Would you support using a competitive process to select projects looking to store carbon dioxide on Crown land? Why or why not?**

   Yes, but that process needs to include private land as well. Enbridge supports Ontario vesting or otherwise asserting control over subsurface pore space for CO2 storage first and then opening a competitive process that would allow proponents to identify blocks or areas of private and public land that would be evaluated and potentially converted to commercial carbon storage.

3. **How should proponents obtain rights to pore space? What are the benefits and challenges associated with adopting the models currently being used in western Canada and US States discussed above?**

   Proponents should obtain rights to pore space through a competitive process referred to in Section 7 above. Pore space rights should be awarded at the evaluation stage and held by the proponent through project development. After completing technical due diligence during evaluation, the proponent can apply for sequestration licenses to develop the pore space as an open-access hub commercially.

4. **Would a staged approach to authorizing carbon storage projects be desirable? If so, how should authorizations be staged?**

   The staged approach introduces risk and uncertainty, especially if the subsequent steps/stages are not well defined upfront. The current approach of "staging" the process for private versus public land is not conducive to investment by project proponents. The current approach that allows evaluation wells but does not include a path to pore space access adds risk and uncertainty to the process. The Government should develop a transparent and seamless process to link Ontario's existing Special Project regulations with commercial-scale regulations, as discussed in Sections 2 and 6 above.

5. **When and how should potential impacts to the agricultural land base and the agri-food network (e.g., operations, infrastructure, agribusinesses, etc.) be considered?**

   Impacts on the agricultural land base and the agri-food network must be mitigated through the entire CCS evaluation and commercial-scale framework, preferably using the recommendations provided by Enbridge in this response to the MNR Discussion Paper. These recommendations include vesting pore space and awarding evaluation projects only to technically competent developers, diligently reviewing evaluation projects and awarding sequestration licenses based on safety and proven geologic containment, leveraging CSA Z741 for operating requirements and MMV, and creating a Post-Closure Stewardship Fund to assist with closure and long-term liability.

   The Natural Gas Facilities Handbook could be modeled to address environmental impacts and assessments through an environmental report, permits and approvals, land use requirements, stakeholder impacts, and impacts on Indigenous communities and Indigenous rights. The Ontario Pipeline Coordinating Committee could provide a review and recommendations for the environmental report.

6. **How should proponents of commercial-scale geologic carbon storage projects notify and engage with Indigenous communities and other parties who may be affected by their proposed projects?**

   See response to Section 9 above.

7. **What operational controls should be put in place to help ensure commercial-scale carbon storage projects would be developed, operated, and decommissioned in a safe and responsible manner?**

   See Sections 10 through 15 above.

8. **Would allowing proponents to transfer responsibility for the long-term monitoring and stewardship of carbon storage projects to the Crown help ensure carbon storage projects, including the wells, geologic storage areas and carbon stored in geological formations, would be adequately cared for over the long-term?**

   Yes, a transfer of responsibility to the Crown after project closure is common practice in many jurisdictions and supported by a comparative analysis evaluating long-term liability in depleted North American oil and gas reservoirs[17]. The same criteria used to support a transfer of liability to the Crown for oil and gas reservoirs can be applied to suitable CO2 storage formation(s).

   See Sections 12 through 15 above for a more detailed discussion.

9. **Would you support components of this framework being delivered by an external entity and if so, what components?**

   Enbridge will support a complete framework that provides transparency across all aspects of geologic carbon storage, from design to evaluation, operations, closure and post-closure.

   CCS represents a new industry for Ontario. The Government needs to add resources to help it develop properly and obtain the potential benefits for all Ontarians.

Conclusion

Enbridge appreciates the opportunity to provide feedback and recommendations on regulating commercial-scale geologic carbon storage projects in Ontario. The components of these regulations must merge seamlessly with the existing Special Project regulations to create an integrated framework across evaluation, commercial scale-up, operations, closure, and post-closure. The integrated framework and regulations must balance fair compensation while keeping costs for emitters as low as possible and encouraging investment from proponents to develop commercial-scale, open-access hubs that provide economies of scale to optimize infrastructure and maximize the utilization of available pore space. Geologic carbon storage provides a societal benefit to Ontarians to reduce greenhouse gas emissions.

If you have any questions or require additional information, please do not hesitate to contact Islam Elsayed, Senior Advisor, Government Affairs (islam.elsayed@enbridge.com).

[17] Long-Term Liability For Carbon Capture And Storage In Depleted North American Oil And Gas Reservoirs - A Comparative Analysis, https://prism.ucalgary.ca/server/api/core/bitstreams/a5063d65-e9c6-4b9f-a30e-de191158b834/content