

DISCUSSION PAPER:  
GEOLOGIC CARBON STORAGE IN  
ONTARIO

January 2022

## CONTEXT

---

In the context of this proposal, the term carbon storage refers only to the long-term underground geologic storage of carbon dioxide in deep bedrock formations and does not include other forms of carbon storage. Although carbon capture and transportation are integral to a geologic carbon storage project, the focus of this proposal is on the storage component.

### **What is carbon storage? Why and how is it used?**

Large quantities of carbon dioxide are generated through processes such as electricity generation from fossil fuel power plants and industrial processes, or as a byproduct of creating hydrogen from methane. One way of reducing the impact of greenhouse gases from these large point sources is to capture and store the carbon dioxide in deep underground bedrock formations.

### **Background**

Under the *Oil, Gas and Salt Resources Act*, the Ministry of Northern Development, Mines, Natural Resources and Forestry (the ministry) regulates the drilling and operation of wells and related equipment used for activities such as the exploration and production of oil and natural gas, salt solution-mining, the underground storage of hydrocarbons, and compressed air energy storage projects using salt caverns. Almost all of these activities occur in southwestern Ontario where the geology is the most conducive. Under Part IV of the *Mining Act*, the ministry administers the disposition of Crown lands related to these activities. These activities are regulated to ensure oil, gas and salt resource exploration and development, and underground geologic storage activities are conducted in a safe, efficient, and orderly manner, with a focus on both public and environmental safety.

In response to evolving energy needs and priorities over time, Ontario businesses have been interested in pursuing new underground geologic storage projects that may share the same space as oil, gas and salt resources but were not contemplated when these regulatory frameworks were developed. The result has been an unregulated business environment that may be a barrier to advancing new technologies and business opportunities in our province.

The geologic storage of carbon dioxide (carbon storage) in deep geological media, is the most recent example of this situation. Businesses have identified Ontario legislation that addresses underground geologic storage as a barrier to advancing projects. This is because standalone geologic carbon storage projects are not covered by Ontario's

## DISCUSSION PAPER – GEOLOGIC CARBON STORAGE IN ONTARIO

current regulatory framework and the laws and the regulatory setting for the advancements of these projects is unclear.

As the province recovers from the economic impacts of the Covid-19 pandemic, Ontario wants to provide a clear and predictable business setting that supports innovation while ensuring the protection of people and the environment. In this context, the ministry is considering changes to the *Oil, Gas and Salt Resources Act* and the *Mining Act* frameworks that would:

- Narrow the prohibitions on the injection of carbon dioxide so that going forward, the prohibition would only apply to the injection of carbon dioxide for the purpose of carbon storage in association with a project to enhance the recovery of oil or gas.
- Allow the ministry to grant authorizations to use Crown land for carbon storage activities.
- Add the ability for the ministry to enter into agreements with companies that want to use wells to explore, test, pilot or demonstrate new technologies (such as carbon storage) in relation to wells used for oil, gas, solution-mined salt as well as underground storage resources. This would provide the ability to bring new types of projects that are associated with the same subsurface spaces where oil, gas, salt or underground storage occur, under the scope of the *Oil, Gas and Salt Resources Act*.
- Enhance provisions for corporate accountability and existing protections, to prevent risks to the public or environment.

### **What areas of Ontario might be geologically suitable for carbon storage?**

Ontario has sedimentary rock formations that may meet some of the key criteria required for the long-term (that is, permanent) storage of carbon dioxide. However, there are several factors that need to be evaluated further to ensure the carbon can be safely, effectively, and economically stored.

It is expected that pilot or demonstration projects would occur in southwestern Ontario in areas that are already generally associated with oil, gas and salt production, and the underground storage of other substances. Some early studies have looked at saline aquifers in southwestern Ontario and it is thought that there is potential for carbon storage in these locations, although more detailed investigation and data collection are required.

## DISCUSSION PAPER – GEOLOGIC CARBON STORAGE IN ONTARIO

Under the right conditions, carbon dioxide might also be stored in other geologic settings such as former hydrocarbon reservoirs where the resource has been depleted. However, the long legacy of drilling for oil and gas in Ontario has affected the suitability of many of these reservoirs for the storage of carbon dioxide. Careful site selection and extensive study would be required to ensure that the carbon dioxide could be stored safely by proponents.

Theoretically other sedimentary rock formations that exist in the Ottawa/St. Lawrence Valley area could have some potential, although the shallow depths, and thin rock layers are likely to make this area unsuitable for carbon storage.

There are also sedimentary rock formations in the Far North that theoretically could have potential for carbon storage, but due to their shallower depths, the remoteness and logistical challenges of access, little exploration has occurred to date. These areas are also not in proximity to the most significant carbon dioxide emission sources and it would be expensive to transport carbon dioxide to these areas where geologic potential is limited or unknown. It is therefore unlikely that any carbon storage activities would occur in this region.

Other geologic formations may also be discovered to be technically and economically feasible for the storage of carbon dioxide in the future, as our knowledge of the geology of Ontario and technology for carbon storage advances.

### **WHAT CHANGES ARE BEING CONSIDERED?**

---

#### **Narrowing the prohibition on the injection of carbon dioxide into a well regulated under the *Oil, Gas and Salt Resources Act***

Under the *Oil, Gas and Salt Resources Act*, there is currently a prohibition on the injection of carbon dioxide for storage in association with certain activities regulated under the act. These include:

1. A project to enhance the recovery of oil, gas or formation water.
2. A project to inject, store or withdraw oil, gas or another prescribed substance.
3. A project to dispose of oil field fluid.
4. Any other prescribed project, activity or undertaking.
5. A compressed air energy storage project or part of a project that is prescribed.

## DISCUSSION PAPER – GEOLOGIC CARBON STORAGE IN ONTARIO

The changes being considered would narrow the prohibition so that it would only apply to enhanced oil and gas recovery projects, while allowing the potential for carbon storage related to other types of activities in wells regulated under this act.

### **Enabling authorization to store carbon on crown land**

Part IV of the *Mining Act* deals with the disposition of Crown resources related to oil, gas, underground storage and salt solution mining. There is currently a prohibition on the permanent storage of any substance (including carbon dioxide) under a storage lease under this part of the act.

Changes to the *Mining Act* that are being considered would modify the current prohibition on the permanent storage of a substance. Amendments to the associated regulation would also be required at a future date to implement this change.

These changes, to accommodate permanent storage, would be limited to carbon storage only, meaning that storage leases could not be used more broadly for the permanent storage or disposal of other substances in underground geologic formations involving Crown land.

### **Providing more certainty and oversight for the demonstration of new technology**

The changes that are being considered would create new authority under the *Oil, Gas and Salt Resources Act* for the ministry to enter into agreements with proponents looking to test, pilot or demonstrate new or innovative activities in wells that are or will be drilled in areas where oil, gas and salt resources are generally found.

The types of activities and projects that would be eligible for agreements would be broader than just carbon storage, making them available for other types of projects that are new to Ontario and that are not subject to the *Oil, Gas and Salt Resources Act*.

Entering into an agreement would be voluntary for proponents, as they are intended to allow for the demonstration of activities that are not currently subject to the act. However, once an agreement is signed, companies would be required by the act to comply with the agreement.

The current structure of the legislative framework creates challenges for enabling new and emerging technologies. Agreements would be nimble, allowing the ministry to work with businesses to support the unique needs of each project while protecting public and environmental safety. This would provide greater certainty for businesses and enable companies to carry out the activities that are necessary to begin investigating the

## DISCUSSION PAPER – GEOLOGIC CARBON STORAGE IN ONTARIO

suitability of a project and to gather data, and progress to design, test, construction, and operational phases for pilot and demonstration projects.

Project proponents would need to secure all the necessary rights to the land (i.e., surface and subsurface rights) before a project could proceed. Agreements would also require that any Indigenous consultation requirements are met in advance of receiving approval to proceed with activities which could adversely impact asserted or established Aboriginal or Treaty rights pursuant to the *Constitution Act, 1982*.

Carbon storage projects and potentially other projects that would be considered for agreements, require long-term management. Before entering into an agreement, proponents would be required to appropriately address all of the phases of the project including any post decommissioning, long-term monitoring and ongoing management that may be required post-closure. These aspects would need to be addressed on a case by case basis, dependent on the needs of Ontario and the project to ensure they can be done safely and responsibly.

Agreements for pilot or demonstration projects would not be subject to hearings or appeals before the Ontario Land Tribunal or the Ontario Energy Board under the *Oil, Gas and Salt Resources Act*. However, if gas storage areas have the potential to be affected, the proposal would be referred to the Ontario Energy Board for a report with respect to the project's potential to impact gas storage. Note that other approval processes, such as municipal approvals for surface facilities, may have similar hearing or appeal opportunities that would not be altered by this proposal.

As the ministry accommodates new activities and technology, stronger, more proactive oversight would be needed to prevent impacts to people and the environment and ensure that project proponents that are undertaking any activity under the *Oil, Gas and Salt Resources Act* are doing so safely and responsibly. To achieve this, the changes being considered include providing that preventative orders could be made to avoid or reduce risks that may result from situations where there are reasonable or probable grounds of risk to public or environmental safety. This would apply broadly for activities that are regulated under the act including as provided for in agreements relating to pilot or demonstration projects. Provisions that would hold directors and former directors of corporations accountable for the actions of a company would also be strengthened; these would apply to all activities under the act.

### **Future regulatory framework for commercial scale carbon storage**

The changes discussed above would be an initial step towards ensuring that new technologies like carbon storage can be regulated and managed in Ontario with appropriate government oversight.

As the ministry learns from the unique needs of demonstration projects, the ministry would better understand the nature of these projects to inform the development of a more predictable, standardized regulatory framework to accommodate commercial scale projects and maintain high standards for public and environmental safety.

One key area that would need to be addressed in a future framework for commercial projects is how the permanent storage of carbon and long term management of these projects would be provided for in a manner that ensures that the responsibility and any potential future liabilities do not fall to the taxpayers of Ontario.

The government is committed to ensuring that potential projects like carbon storage can continue to progress, while recognizing that flexibility is currently needed to develop and test these technologies that are new to Ontario.

These measures would ensure businesses have a path to enable their pilot or demonstration projects with the appropriate oversight and accountability, and would foster flexible, adaptable approaches, while protecting public and environmental safety.

The ministry is interested in hearing your views and thoughts on the changes that are being considered and the potential future regulation of carbon storage projects in Ontario.