

Carbon Capture and Storage



our challenge

To meet global targets for reducing greenhouse gas emissions and avoid irreversible climate change, a collection of different actions is needed from countries around the world.

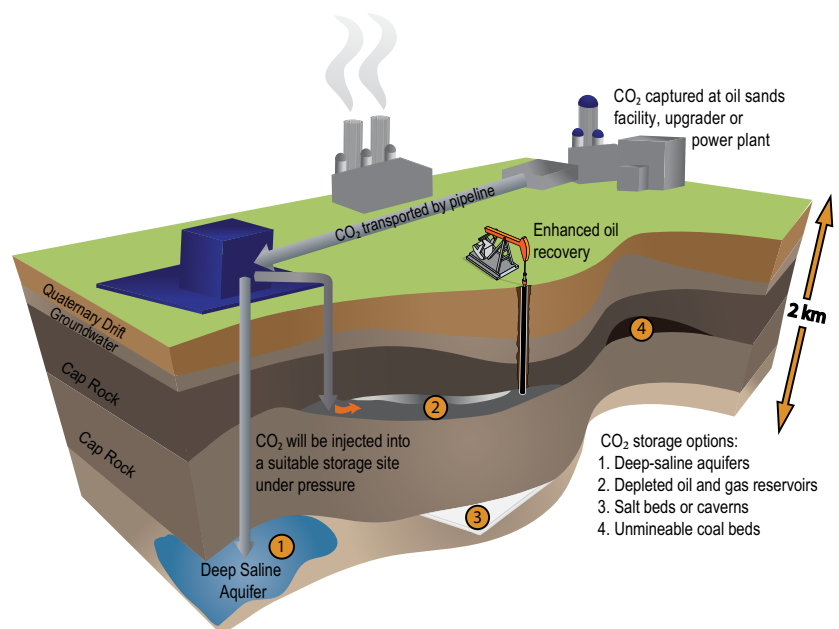
The United Nations' Intergovernmental Panel on Climate Change, the US administration and the Canadian government agree that carbon capture and storage is crucial to help the world make necessary, long-term reductions in greenhouse gases.

our actions *

Alberta has made a \$2-billion commitment to this clean energy technology. This investment will result in a collection of projects, pipelines, storage and financing that is unique in the world.

how it works

- > Carbon dioxide (CO₂) is separated from other emissions before it exits the stack.
- > CO₂ is dehydrated and then compressed, converting it into liquid.
- > Liquid CO₂ is transported by pipeline to storage stations that then pump the liquified CO₂ one to two kilometres underground into porous rock formations.
- > The storage site is sealed and monitored by experts to ensure there are no impacts to the environment or public safety.



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global support

- > Carbon capture and storage projects are being pursued around the world in a variety of countries, including Norway, the United Kingdom, the United States and Australia.
- > The Intergovernmental Panel on Climate Change fully supports carbon capture and storage technology, as does the International Energy Agency.
- > The Canadian government is also working closely with the United States government on a North American Clean Energy Dialogue. One of the key pillars in the dialogue is looking at joint carbon capture and storage opportunities.
- > Projects in North America, Norway and North Africa have safely stored millions of tonnes of CO₂ underground for years.

why it works in alberta

> Geology

- For the same reason that Alberta has abundant oil and gas resources, it also has a tremendous capacity to safely and securely store CO₂ underground. This is a result of porous rock formations beneath solid cap rock in the Western Canadian Sedimentary Basin.
- Liquid CO₂ fills the small spaces in the porous rock, while the solid cap rock above ensures the liquid stays in place.

> Unique Emissions Profile

- The majority of Alberta's emissions come from large industrial facilities like coal-fired power plants and oil and gas facilities that are more appropriate for commercial-scale carbon capture and storage.

enhanced oil recovery

- > Alberta's oil and gas industry has been using CO₂ for enhanced oil recovery successfully for decades to produce oil from depleting reservoirs.
- > Enhanced oil recovery is a means to obtain more conventional oil – and the resulting royalties, taxes, economic growth and jobs – while using infrastructure already in place.
- > Best estimates show that 1.4 billion barrels of otherwise untapped oil could be produced from existing conventional reservoirs in Alberta with carbon capture and storage, generating between \$11 billion and \$25 billion in provincial royalties and taxes.

projects

- > Alberta has signed a grant agreement for the Alberta Carbon Trunk Line which will create a pipeline system to transport CO₂. Work is underway to finalize agreements for three additional projects that will:
 - Green oil sands supply at the upgrading stage (Quest Project)
 - Green electricity production at Alberta coal-fired electricity plants (Project Pioneer)
 - Produce clean energy with in-situ coal gasification (Swan Hills Synfuels Project)
- > Once all projects are fully developed, they are expected to reduce emissions by five million tonnes per year, beginning in 2015.

next steps

- > In December 2010, the province passed legislation to guide how CCS projects will proceed, including clarifying ownership of pore space, addressing longterm liability and establishing a fund financed by operators for ongoing monitoring costs and any required remediation.

CCS Suitability in the Western Canadian Sedimentary Basin

