



talk about carbon capture & storage

November 2009

What is CCS?

Carbon capture and storage (CCS) is a process that captures carbon dioxide (CO₂) emissions and stores them in geological formations deep inside the earth.

CO₂ contributes to greenhouse gas emissions (GHGs), the bulk of which come from the production and use of fossil fuels—coal, oil and gas—as well as electricity. CCS also has the potential to reduce emissions from Alberta's value-added and manufacturing industries, such as petrochemical development.

What's happening with CCS in Alberta?

On April 24, 2008, Premier Ed Stelmach announced the creation of the Alberta Carbon Capture and Storage Development Council. The council brings together experts from the public and private sector. Setting up the council was a commitment made in Alberta's 2008 Climate Change Strategy. Under the strategy, Alberta committed to reducing projected emissions by 200 megatonnes by 2050—70% of which will be achieved through CCS.

On July 8, 2008, the Alberta Government announced it will contribute \$2 billion to reduce GHG emissions through new CCS projects. The expected result is five million tonnes in annual reductions by 2015—comparable to taking one million vehicles off the road.

Is CCS safe?

Experience in Canada and around the world has shown that CCS can be done safely and produce positive environmental results.

In Alberta, porous sedimentary rock formations beneath non-porous formations are ideally suited for the injection and long-term, safe and secure storage of carbon dioxide.

The CO₂ will be separated from other emissions, then dehydrated, compressed and transported by pipeline to a storage site where it will be injected one to two kilometres deep into the porous rock formation.

It will then be sealed and monitored by experts to ensure there is no leakage or impact on either public safety or the environment.

Does CCS work?

In North America, a successful CCS pilot project pipes CO₂ from Beulah, North Dakota to Weyburn, Saskatchewan where it is injected into a depleted oil field.

Since 2000, more than 13 million tonnes of CO₂ have been injected into the oil field with no adverse effects. An international team of scientists has detected no leakage of CO₂ after extensive monitoring of the project.

CCS projects are being pursued around the world in a variety of countries including Norway, the United Kingdom Denmark and Australia.

Alberta's \$2 billion in funding will enable the province to take the lead in advancing the technology and actual applications that can be marketed to other jurisdictions.

The United Nations Intergovernmental Panel on Climate Change fully supports CCS technology as does the International Energy Agency.

Why is the Alberta government investing in CCS?

CCS provides an opportunity for the province to reduce GHGs while ensuring Alberta's and Canada's economic success and growth can continue.

This provincial investment is intended to accelerate the development of projects and encourage the necessary investment from industry to make CCS viable in Alberta.

Industry produces commodities that Albertans use, including electricity, natural gas and oil. The products, such as oil, that are exported to other jurisdictions represent the core of Alberta's economy, and create jobs, royalties and taxes.

An investment in CCS is also an investment in the environment. CCS in Alberta has the potential to be North America's largest single source of GHG emissions reductions.

CCS demonstrates Alberta's action to reduce emissions while continuing to be a major supplier of resources that are developed in an environmentally responsible manner.



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What are the different costs associated with CCS?

Capturing CO₂ from the source, which is typically a smokestack, is the most expensive part of the CCS process. Retrofitting existing facilities to capture CO₂ would have significant costs, as would integrating CO₂ capture into the design of new plants.

Transporting the CO₂ through a pipeline is the least expensive part of CCS and injecting it deep into the earth is more expensive than transporting it.

How does CCS promote value-added development?

CCS will help keep investment in new value-added projects in Alberta, rather than moving to jurisdictions without climate change emissions targets.

Value-added development—such as bitumen upgraders, refineries and petrochemical plants—help provide thousands of sustainable, long-term jobs for Albertans.

Investing in this new technology will help ensure our economy continues to grow, providing additional jobs, taxes and energy revenues.

What is enhanced oil recovery?

Enhanced oil recovery (EOR) involves capturing CO₂ and injecting it into depleting oil reserves. The CO₂ provides the pressure needed to enhance the flow of the oil, which makes it easier to pump to the surface.

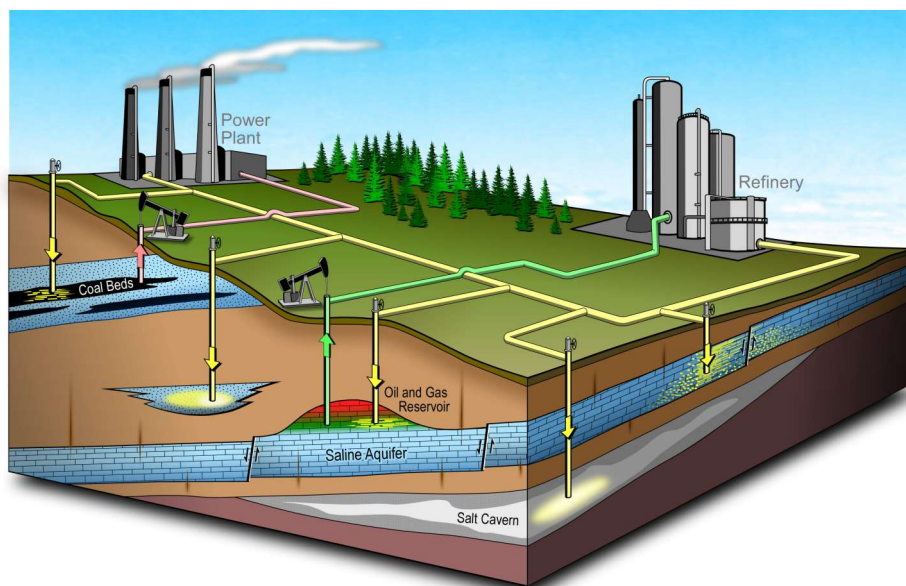
There are many successful CO₂ EOR projects already underway in Alberta. One project in central Alberta is expected to increase oil recoveries by 18%.

Research shows that between 500 million and two billion barrels of conventional oil may be recoverable by EOR in Alberta. Supporting the development of CCS and EOR projects offers the potential for new jobs and increased energy royalties for Alberta.

CO₂ injection also offers significant potential for the enhanced development of coalbed methane.

“For well-selected, designed and managed geological storage sites, the vast majority of the CO₂ will gradually be immobilized by various trapping mechanisms and, in that case, could be retained for up to millions of years.”

-The Intergovernmental Panel on Climate Change



Graphic courtesy Alberta Geological Survey

How CCS works

- Takes CO₂ that would otherwise be emitted into the air and stores it one to two kilometres deep underground.
- CCS is successfully being used in Norway, Australia and in Denmark without adverse effects.
- This technology is successfully being used to enhance oil recovery in older fields throughout Alberta.