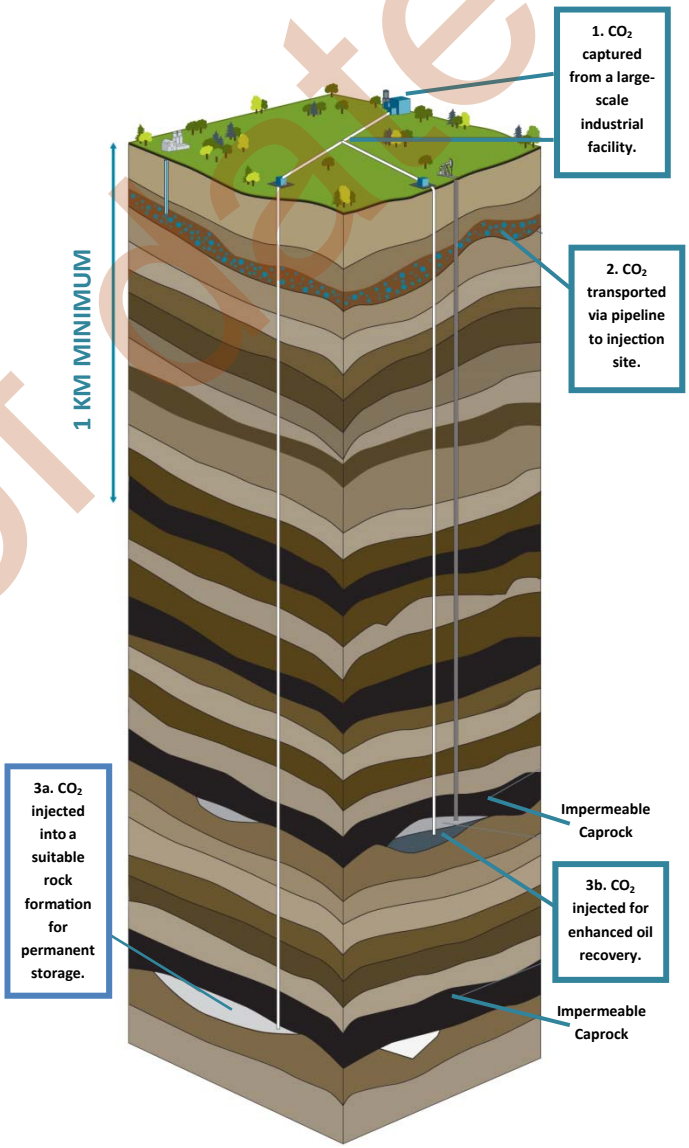
Carbon Capture and Storage (CCS)

What is CCS?

CCS is a technology used to reduce carbon dioxide (CO_2) emissions from large-scale industrial facilities, which account for 70% of Alberta's emissions (e.g., oil sands, electricity generation, cement, and petrochemical manufacturing facilities). CCS is a safe and permanent means of CO_2 emission reduction. A CCS project will:

1) capture emissions that would normally be vented into the atmosphere,
2) transport the emissions to a well site, and
3) inject the CO_2 into deep underground rock formations for permanent storage.

Alberta has the ideal geology for CCS. The same rock formations that have securely stored oil and gas for millions of years can store CO_2 permanently.



What is Alberta Doing to Advance CCS?

The Alberta government has committed $1.24 billion to two commercial-scale CCS projects in the oil sands and fertilizer sectors—the Quest and the Carbon Trunk Line projects. The projects will capture a combined 2.76 million tonnes of CO_2 per year, equivalent to the yearly emissions from approximately 600,000 cars. Alberta has already seen real reductions in its greenhouse gas emissions as the Quest project began commercial operations in October 2015 and has since stored well over a million tonnes of CO_2. The Alberta Carbon Trunk Line is expected to be operational in 2018.

The Alberta government also works to ensure it has the right regulations in place to support safe and environmentally responsible CCS development.

CCS Projects in Alberta

The Quest Project

Fully Operational: October 2015

Project Partners: Shell Canada, Chevron, and Marathon Oil

Photo courtesy of Shell: Shell Quest Project

The Quest project captures CO_2 from an oil sands upgrader and transports it 65 kilometres north for permanent storage two kilometres below the surface. Quest is designed to capture up to 1.08 million tonnes of CO_2 per year (approximately 35% of the CO_2 produced by the upgrader). Quest is the first application of CCS technology at an oil sands upgrader.

The Alberta government has committed $745 million in funding through 2025 for this project. More information on the Quest project is available at:
https://www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html

The Alberta Carbon Trunk Line Project (ACTL)

Fully Operational: 2018

Project Partners: Enhance Energy, North West Redwater Partnership and Wolf Carbon Solutions Inc.

The ACTL is a 240- kilometre pipeline that will carry CO_2 captured from the Sturgeon Refinery and the Agrium fertilizer plant to enhanced oil recovery projects in central Alberta. The ACTL will initially see an emissions reduction of 1.68 million tonnes of CO_2 per year when the project is fully operational in 2018.

The design capacity of the pipeline is 14.6 million tonnes of CO_2 per year, which could allow future CCS projects to use it if the CCS industry expands. The Alberta government has committed $495 million through 2025 for this CO_2 infrastructure project.

More information on the ACTL is available at:
http://www.enhanceenergy.com
https://nwrsturgeonrefinery.com/
https://www.wolfmidstream.com/ab-carbon-tl/

CCS Throughout the World

Governments, environmental agencies and technical organizations worldwide are promoting CCS as one way of combatting climate change. There are approximately 21 large-scale CCS projects in operation or under construction world-wide.

CCS technologies have existed for decades and are proven to safely reduce CO_2 emissions from large-scale emitters. Some notable examples include:

Norway's Sleipner Project

The Sleipner Project has safely and permanently stored over 16 million tonnes of CO_2 from an offshore natural gas processing plant in a deep geological formation under the ocean floor.

Saskatchewan's Boundary Dam Project

The Boundary Dam project retrofitted a coal-fired electricity generation unit with CCS technology, continuing power generation with potential to reduce over 1 million tonnes CO_2 emissions annually.

Sharing Alberta's CCS Knowledge

The Alberta government's investment in CCS is helping to reduce barriers that industry faces in implementing large-scale CCS technology. Alberta has committed to sharing the knowledge gained from the publicly funded CCS projects. The documents are available through Alberta's Open Government site, but permission for use must be obtained directly from the companies.