

Carbon capture, utilization and storage

What is carbon capture, utilization and storage?

Carbon capture, utilization and storage (CCUS) is a technology that reduces carbon dioxide (CO₂) emissions from large-scale industrial facilities.

The technology captures CO₂ emissions that would typically be vented into the atmosphere. The captured emissions are then transported and injected into deep geological formations for permanent storage, or they are recycled and used in a variety of innovative and value-added processes.

Technologies for the capture, injection and permanent storage of CO₂ have existed for decades and are proven to safely reduce CO₂ emissions. Alberta has ideal geology for CCUS. Rock formations that have securely stored oil and gas for millions of years can also safely store CO₂ permanently.

Advancing CCUS in Alberta

Alberta's government committed \$1.24 billion to two commercial-scale CCUS projects in the oil sands and fertilizer sectors – Quest and the Alberta Carbon Trunk Line projects.

Both projects are fully operational and capturing up to a combined 2.76 million tonnes of CO₂ per year. This is the equivalent to the yearly emissions from approximately 600,000 vehicles.

Alberta's government continues to work to ensure the right regulations are in place to support safe and environmentally responsible CCUS development.

Quest Project



Photo courtesy of Shell

Project Operator and Partners: Shell Canada Energy, Canadian Natural Upgrading Limited, Chevron Canada Oil Sands Partnership, and 1745844 Alberta Ltd.

Commencing commercial operation in October 2015, the Quest project captures CO₂ from the Scotford Upgrader in Fort Saskatchewan and transports it 65 kilometres north for permanent storage two kilometres below the earth's surface.

Quest is designed to capture more than one million tonnes of CO₂ per year, which is approximately 35 per cent of the CO₂ produced by the upgrader. More than eight million tonnes of CO₂ have been injected since 2015. Quest is the first application of CCUS technology at an oil sands upgrader.

Alberta's government has committed \$745 million through 2025 for this project.

Alberta Carbon Trunk Line Project



Photo Courtesy of Enhance Energy Inc.

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

Commencing commercial operation in May 2020, the Alberta Carbon Trunk Line project consists of a 240 kilometre pipeline that carries captured CO₂ from the Sturgeon Refinery and Redwater Fertilizer Facility in Sturgeon County for use in enhanced oil recovery in Clive, Alberta. More than 3.5 million tonnes of CO₂ have been sequestered since 2020. The pipeline's design has the capacity for 14.6 million tonnes of CO₂ per year, allowing for use by future CCUS projects as the industry grows.

Alberta's government has committed \$495 million through 2025 for this project.

New Innovation

Opened in May 2018, the Carbon Capture and Conversion Technology Centre in Calgary is a state-of-the-art-facility that tests and advances CO₂ utilization technologies while reducing emissions.

Owned and operated by InnoTech Alberta – a subsidiary of Alberta Innovates – the Centre was created by provincial and federal government collaboration under the Pan-Canadian Framework on Clean Growth and Climate Change.

Sharing Alberta's CCUS Knowledge

Alberta's government investment in CCUS is helping reduce barriers that industry faces when implementing large-scale CCUS technology.

Both funded CCUS projects are required to share technical information and what was learned. This will help future CCUS projects around the world benefit from Alberta's experience.

Through Alberta's CCS Knowledge Sharing Program, the Province is committed to sharing what it learns about the technology and its implementation from publicly-funded CCUS projects.

[Carbon capture, utilization and storage - Knowledge sharing](#)

CCUS throughout the world

Many governments, environmental agencies and technical organizations worldwide are promoting CCUS as a way of combatting climate change. Currently, there are 37 carbon capture and storage projects in operation around the world with a capture capacity of over 50 million tonnes per year of CO₂. Globally, there are currently more than 200 facilities in development and 20 under construction.

These projects include capturing CO₂ at natural gas processing, fertilizer production, power generation and hydrogen production facilities for dedicated permanent storage or use in enhanced oil recovery. CCUS technology is being used in several jurisdictions including Saskatchewan, United States, Norway, the United Arab Emirates, Brazil and Australia.