

# Carbon Capture, Utilization and Storage

## Ensuring Public and Environmental Safety

### What is Carbon Capture, Utilization and Storage (CCUS)?

Carbon Capture, Utilization and Storage (CCUS) is a technology that safely helps protect the environment by capturing carbon dioxide (CO<sub>2</sub>) and storing it deep in the ground. This keeps it from getting into the air and contributing to climate change.

### How does it work?

The technology captures CO<sub>2</sub> emissions that come from a plant or industrial site and stops them from being released into the atmosphere. The captured emissions are then transported and stored underground in deep geological formations. They are typically stored one kilometer or more below the surface. They can also be recycled and used in a variety of innovative ways.

### Is this a proven technology?

Yes. Technologies for the capture, injection and permanent storage of CO<sub>2</sub> have existed for decades.

Carbon capture and storage is a proven technology that is deployed around the world, including Saskatchewan, the United States, Norway, Australia, China and Iceland. CCUS technology has been in use for more than 50 years, and around 300 million tonnes of CO<sub>2</sub> have already been successfully captured and injected underground (Source: Global CCS Institute).

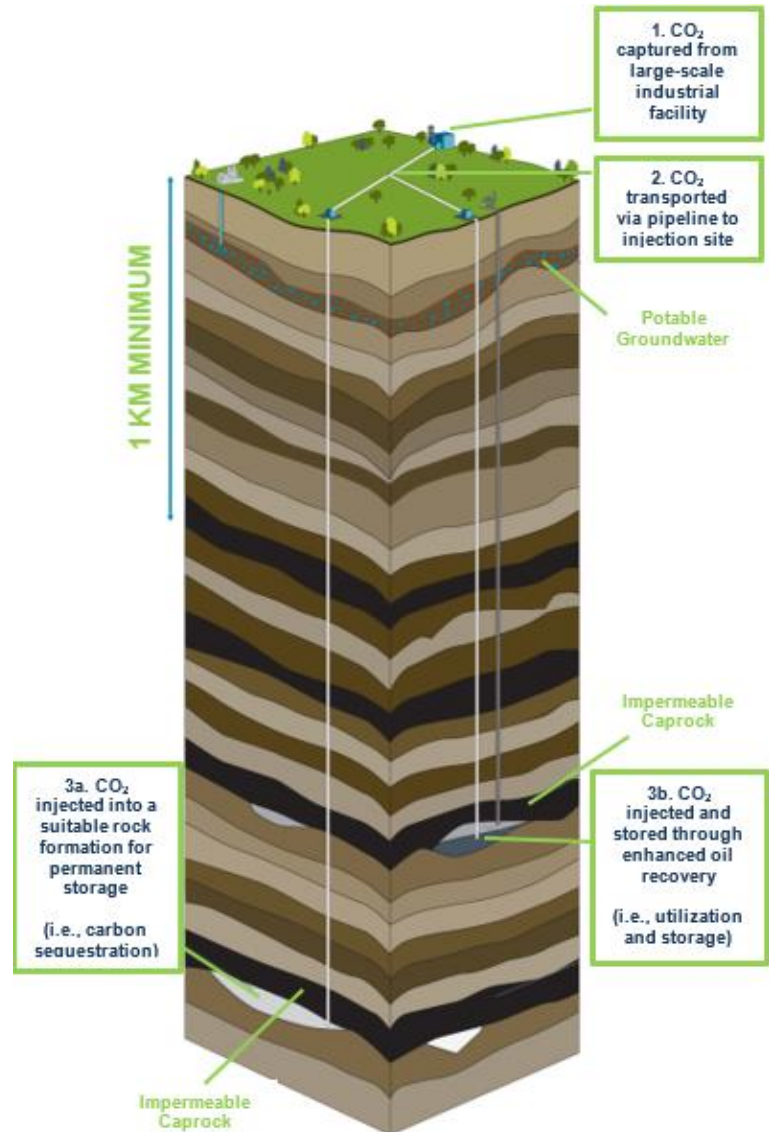
### Why is CCUS important?

CCUS is critical to meeting Canada and the world's long-term energy needs and climate goals. Alberta is among the global leaders in developing CCUS technology.

The International Energy Agency and other sources say that, without substantial support to further develop and employ this technology, it will be difficult for Canada to meet its emission reduction targets.

By continuing to advance this technology, we will help Alberta diversify the energy sector and reduce emissions in many different industries, including hard-to-abate sectors like concrete and fertilizer, and hydrogen development.

Alberta's skilled workforce and years of expertise in CCUS are critical to helping industries in Alberta - and across Canada - meet our country's emissions goals.



## Safely developing carbon storage hubs

There is a growing demand for carbon storage hubs in Alberta. To help meet this growing demand, the Alberta government is issuing carbon sequestration rights through a series of competitions to enable the safe development of carbon storage hubs. In 2022, Alberta selected proposals to begin exploring how to develop environmentally safe hubs across the province.

A carbon sequestration hub will be an area of pore space deep underground overseen by a successful private industry proponent who can effectively plan and operate these hubs to store CO<sub>2</sub> captured from various emissions sources as a service to industrial clients. Any approved project will need to pass rigorous standards for safety.

Along with storage hubs, government will continue to explore other carbon sequestration scenarios, including small scale and remote opportunities.

## Why is Alberta exploring this?

Developing carbon storage will help diversify the energy sector, including developing clean hydrogen and supporting the shift towards a net-zero electricity grid.

Located in the Western Canadian Sedimentary Basin, Alberta has ideal geology for CCUS. Rock formations that have securely stored oil and gas for millions of years can also safely store CO<sub>2</sub> permanently.

## Has Alberta used CCUS before?

Yes! Alberta is among the global leaders and has a strong track record in employing this technology. To date, the province has invested or committed more than \$1.8 billion to support CCUS-related projects and programs.

For example, the Quest and Alberta Carbon Trunk Line projects have safely captured and stored a total of more than 10.5 million tonnes of CO<sub>2</sub> since starting operations. That's the equivalent of emissions from more than 2.25 million vehicles per year.

## Will these storage hubs impact the water and lands above?

No. Captured carbon dioxide from large-scale projects is stored deep below the earth's surface, typically more than one kilometer underground.

Research demonstrates that various geological trapping mechanisms will contain the CO<sub>2</sub> deep underground. Careful site selection and rigorous monitoring serve to ensure the injected CO<sub>2</sub> remains sequestered and does not have any impact on fresh water, plants or the soil.

Alberta has some of the most stringent guidelines in the world to protect public safety, the environment and landowners. For any CCUS project to move forward, the operator will need to obtain regulatory approvals for energy-related facilities from the Alberta Energy Regulator for CO<sub>2</sub> capture, transportation, subsurface injection and storage activities.

All carbon capture projects must provide and follow a comprehensive monitoring, measurement and verification (MMV) plan and provide a site closure plan. This MMV plan is intended to ensure the injected CO<sub>2</sub> is contained and conforming to the predictive modelling in order to protect human health, groundwater resources, hydrocarbon resources and the environment.

## Are storage hubs good for the environment?

Yes, research shows that this technology is a safe way to store carbon underground to reduce greenhouse gas emissions. Captured CO<sub>2</sub> from industrial facilities is securely stored deep underground in specific types of underground geological formations.

## Where can I find out more?

More information about carbon sequestration tenure management and the competitions to develop storage hubs can be found at: <https://www.alberta.ca/carbon-capture-utilization-and-storage-hub-development-process.aspx>

For more information on carbon capture and storage, visit the Global CCS Institute webpage at: <https://www.globalccsinstitute.com/>

More information about the role of the Alberta Energy Regulator can be found at: <https://www.aer.ca/providing-information/by-topic/carbon-capture>