

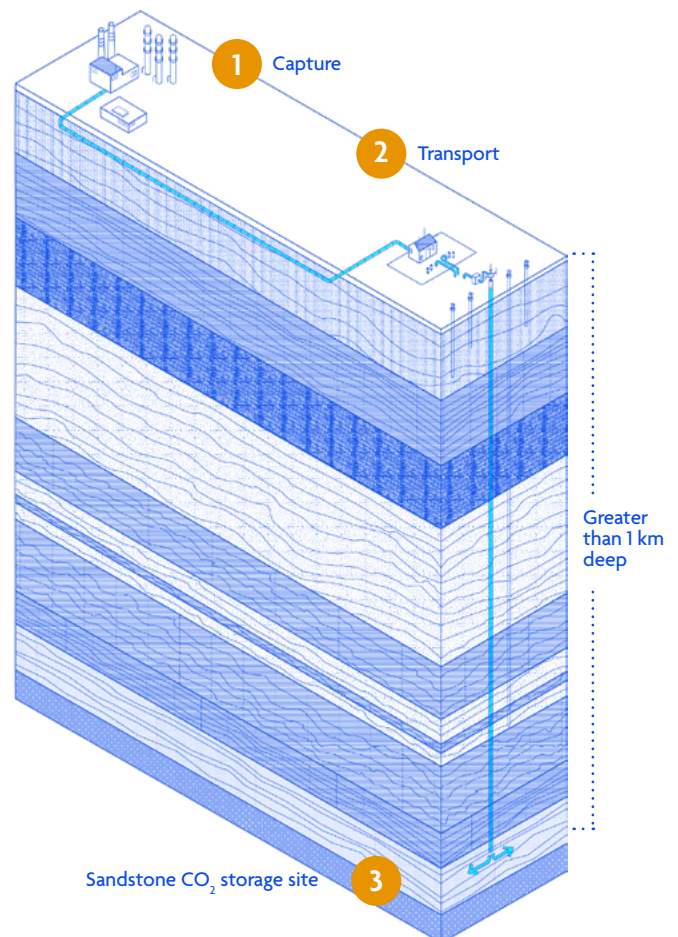


Carbon capture and storage

The proposed foundational project of the Pathways Alliance plan to reach net-zero emissions from operations is a carbon capture and storage (CCS) network. When complete, it will have the capacity to transport captured CO₂ from more than 20 oil sands facilities to a storage hub in the Cold Lake region of northeast Alberta. The network, which will include a 400-kilometre pipeline, will be one of the largest in the world.

Carbon capture

Carbon capture and storage, or CCS, is a proven, reliable process that's been used around the world for more than 45 years to mitigate environmental impacts by reducing CO₂ emissions from fuel combustion or industrial processes. CCS technologies capture CO₂ from a facility before it is released into the atmosphere and transport it by pipeline (primarily following existing rights of way) to a secure location, where it can be safely stored underground in deep geological formations. These formations are typically between one to two kilometres beneath the Earth's surface.





How CCS works

CCS is a three-step process that includes capture, transport and storage.



Step 1: Capture

In this process, capture equipment is fitted to the flue stack of an industrial facility. The equipment diverts flue gas containing CO₂ into vessels before it reaches the atmosphere. In the vessels, a chemical is used to separate and capture the CO₂ content from the remaining flue gas.



Step 2: Transport

Captured CO₂ is compressed to convert it to a liquid. The liquid CO₂ is transferred by a specially designed pipeline to the secure storage hub. The proposed Pathways Alliance CO₂ transport line in northern Alberta will primarily follow existing rights of way.



Step 3: Storage

Liquid CO₂ is injected into the injection wells at a secure storage hub. At the proposed Pathways Alliance storage hub, liquid CO₂ will be injected into a saline (non-potable) aquifer deep underground.

Injected CO₂ remains in the deep geological formation permanently, trapped beneath cap rock.

CCS: Safely reducing carbon emissions

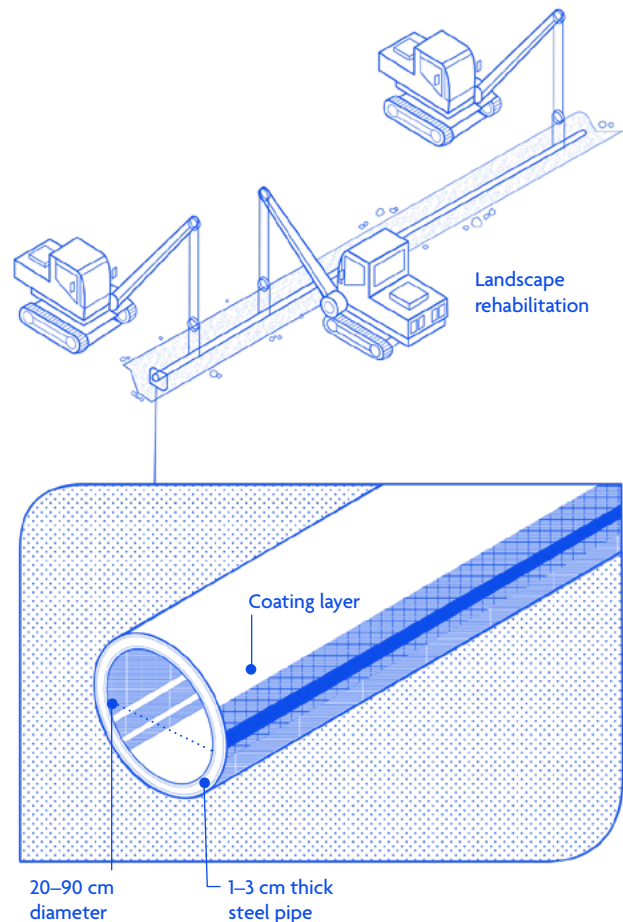
Reducing carbon emissions

Canada's oil sands industry has an important role to play in helping reach the national goal of net-zero emissions by 2050. Achieving this ambitious goal will ensure our sector can continue to significantly contribute to the Canadian economy, while supporting global energy security.

Safety

Located in the Western Canadian Sedimentary Basin, Alberta has ideal geology for the safe, permanent storage of captured CO₂. Rock formations that have securely stored oil and gas for millions of years can also store CO₂ permanently. These multiple overlying layers of impermeable rock formations act as natural seals.

Alberta is among the global leaders in carbon capture and storage and has a strong track record. For example, the Quest and Alberta Carbon Trunk Line projects have safely captured, transported and stored more than 10 million tonnes of CO₂ since starting operations, according to the Alberta government.



ABOVE: In the transport process, liquid CO₂ is transferred by a specially designed pipeline to the secure storage hub. The proposed Pathways Alliance CO₂ line will follow existing pipeline routes wherever practical, to limit land disturbance.



Deep and safe storage

Captured CO₂ is stored deep below the Earth's surface, typically between one and two kilometres underground. By comparison, fresh water in this area is typically around 150 metres below the surface. The CO₂ storage layer is well below any fresh water sources.

Scientific research and decades of experience developing carbon capture technologies has demonstrated that the right rock formations, such as the ones at our proposed Alberta storage site, will contain the CO₂ deep underground.

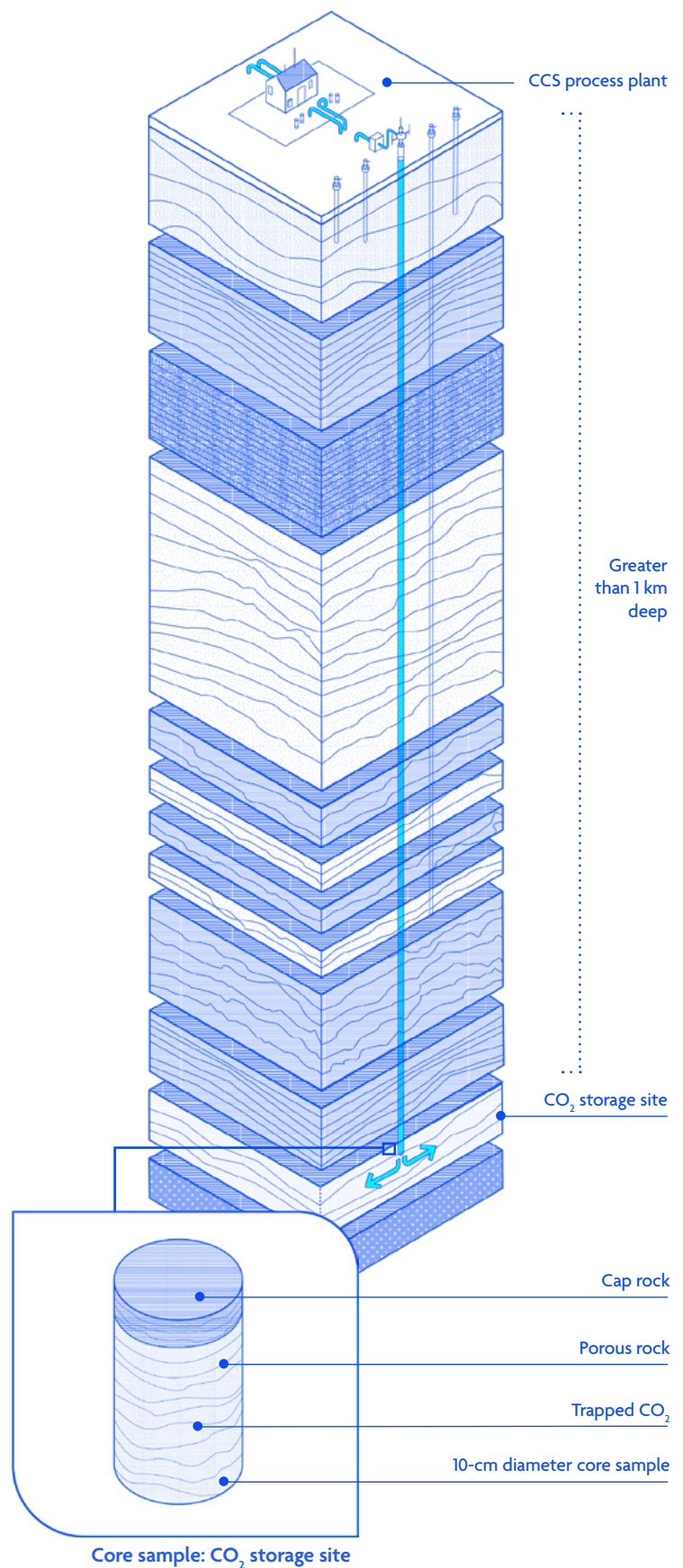
The proposed project involves careful site selection and extensive monitoring to ensure the injected CO₂ remains sequestered and does not have any impact on the environment or geological stability.

Monitoring

Because Alberta was an early adopter of CCS, the province has comprehensive legislation governing this process.

The Pathways Alliance team has significant technical experience understanding subsurface reservoirs, rock properties and the ways in which CO₂ can be safely transported and stored.

The Pathways Alliance team will conduct extensive monitoring underground in the injection wells, the storage formation, deep monitoring wells and shallow groundwater wells to provide the highest possible levels of assurance to Indigenous groups and other nearby communities and individuals.



Visit the Pathways Alliance website at PathwaysAlliance.ca. You can also reach us at contact@pathwaysalliance.ca.

ABOVE: Rock formations that have securely stored oil and gas for millions of years can also safely and permanently store CO₂. These multiple overlying layers of impermeable rock formations act as natural seals.