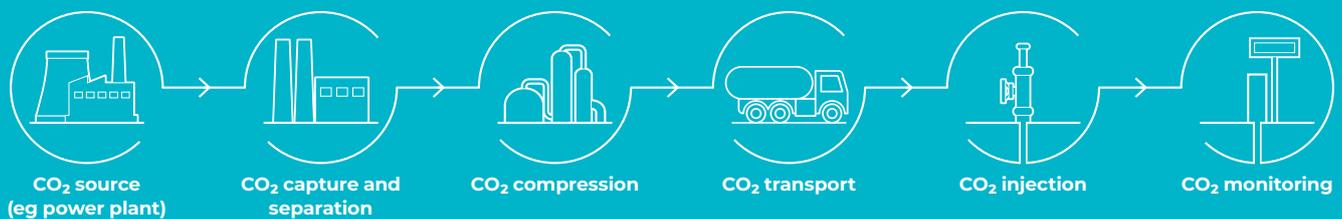
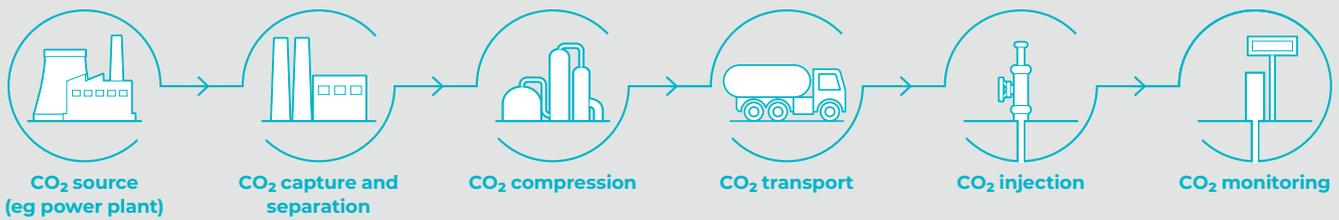


CTSCo's Surat Basin Carbon Capture and Storage Project

The Surat Basin Carbon Capture and Storage Project aims to determine the viability of industrial-scale carbon capture and storage in the Surat Basin. The project is funded by both industry and government.



THE CARBON CAPTURE AND STORAGE PROCESS



WHAT IS CARBON CAPTURE AND STORAGE AND HOW DOES IT WORK?

Carbon capture and storage is a group of technologies which can capture up to 90% of the CO₂ emissions produced by using fossil fuels in electricity generation and industrial processes, and stores this CO₂ underground. This prevents the CO₂ from entering the atmosphere and adding to global emissions.

Carbon capture and storage involves three major steps:

- **Capture:** the separation of CO₂ from other gases produced at large industrial process facilities such as coal and natural gas power plants, oil and gas plants, steel mills and cement plants.
- **Transport:** once separated and cleaned, the CO₂ is compressed and transported via pipelines, or in this case trucks, for geological storage.

- **Storage:** CO₂ is injected into deep underground geological formations, often at depths of one kilometre or more.

Carbon capture and storage combines safe and proven technologies which have been in use for decades. Carbon capture and storage is currently being used around the world and is cutting global CO₂ emissions, with 17 large-scale operational projects already capturing and storing more than 220 million tonnes, safely and efficiently.

WHY IS CARBON CAPTURE STORAGE IMPORTANT?

The use of fossil fuels releases CO₂ into the atmosphere adding to global emissions.

In addition to electricity generation, many other industrial processes including the production of cement, steel, fertilisers and chemicals require fossil

fuels. These industrial products are used in almost every aspect of modern life including infrastructure (buildings, roads, bridges, etc), housing and food production.

The International Energy Agency (IEA) reports that even with concerted action under the Paris Agreement nationally determined contributions from each country, fossil fuels will still provide 60%–75% of the world's primary energy by 2040. The IEA has said that carbon capture and storage will play a 'unique and vital role' in the global reduction of greenhouse gas emissions from the use of fossil fuels.

IS THIS A PROVEN TECHNOLOGY?

Carbon capture and storage is not new. It is a proven technology that is already being deployed at industrial scale. There are projects all around the world, some of which have been operating for almost 20 years.

WHO IS INVOLVED IN CTSCO'S SURAT BASIN CARBON CAPTURE AND STORAGE PROJECT?

Carbon Transport and Storage Corporation (CTSCO) Pty Limited is a wholly owned subsidiary of Glencore, one of the world's largest diversified natural resources companies.

WHO ARE THE PROJECT FUNDERS?

Funding is being provided by Australian Coal Association Low Emissions Technologies Ltd (ACALET) and the Commonwealth Government.

The project has also received financial support for separate research and development projects from the Australian National Low Emissions Coal Research and Development (ANLEC R&D).

WHAT GOVERNANCE IS IN PLACE?

Project oversight and reporting

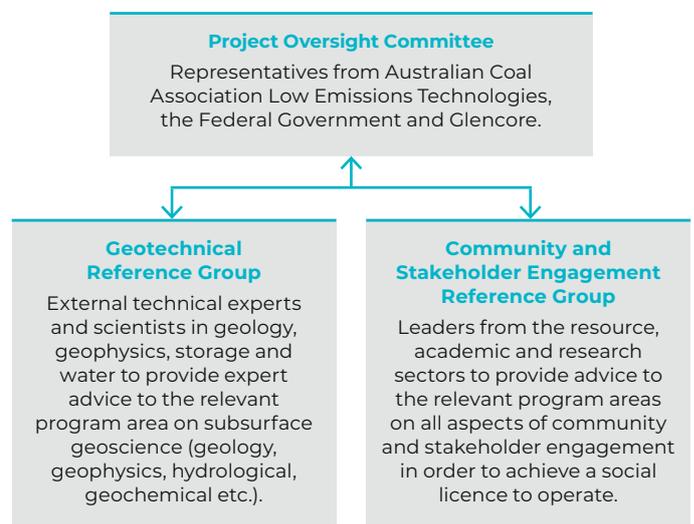
A Project Oversight Committee was established as part of the ACALET funding agreement to:

- Provide strategic guidance and assistance
- Facilitate co-operation and collaboration
- Monitor and review the progression of the Project.

The Project Oversight Committee includes representatives from ACALET, the Federal Government and Glencore.

External review and continuous improvement process

Two expert reference/review groups have been established to provide independent, expert advice on relevant program areas and report to the Project Oversight Committee.



ABOUT THE PROJECT

The Surat Basin Carbon Capture and Storage Project aims to determine the viability of industrial-scale carbon capture and storage in the Surat Basin.

WHY THE SURAT BASIN?

The Queensland Government has identified the Surat Basin as one of the most prospective locations for large commercial scale CO₂ storage potential. The Surat Basin is home to a number of coal-fired power stations and other emission sources making it an ideal location for a carbon capture and storage project.

The Queensland *Greenhouse Gas Storage Act 2009* allows for exploration and testing for the feasibility of storage of CO₂.

In 2012 CTSCo was awarded a permit by the Queensland Government under the *Greenhouse Gas Storage Act 2009*

authorising carbon storage exploration activities under an Environmental Authority.

This gave CTSCo permission to find a suitable location to investigate storing CO₂. The permit does not authorise injection of CO₂. Injection of CO₂ will require further regulatory assessment and approval by the Queensland Government.

WHY AT GLENHAVEN?

Sitting within the approved permit area, Glenhaven, a nine square kilometre block of land owned by Glencore is well suited for a small scale CO₂ trial injection.

The geology beneath Glenhaven has been studied in great detail and we know

through our studies that the Precipice Sandstone aquifer is overlaid by a thick layer of impermeable rock known as the Evergreen Formation.

This layer acts as a seal on top of the Precipice Sandstone aquifer, preventing upward movement of fluids. This means it will prevent the movement of CO₂ to the shallow aquifers that lie above the Precipice Sandstone, which are the main source for water bores in the region.

The injected CO₂ is predicted to remain in the aquifer, close to the injection site indefinitely.

GLENHAVEN SITE CHARACTERISTICS

1) Suitable geology

The Precipice Sandstone at this location is highly permeable. This means CO₂ can be easily injected into the Precipice Sandstone formation.

The thick impermeable Evergreen Formation, located directly above the Precipice, also forms a seal to ensure the CO₂ remains where it is injected.

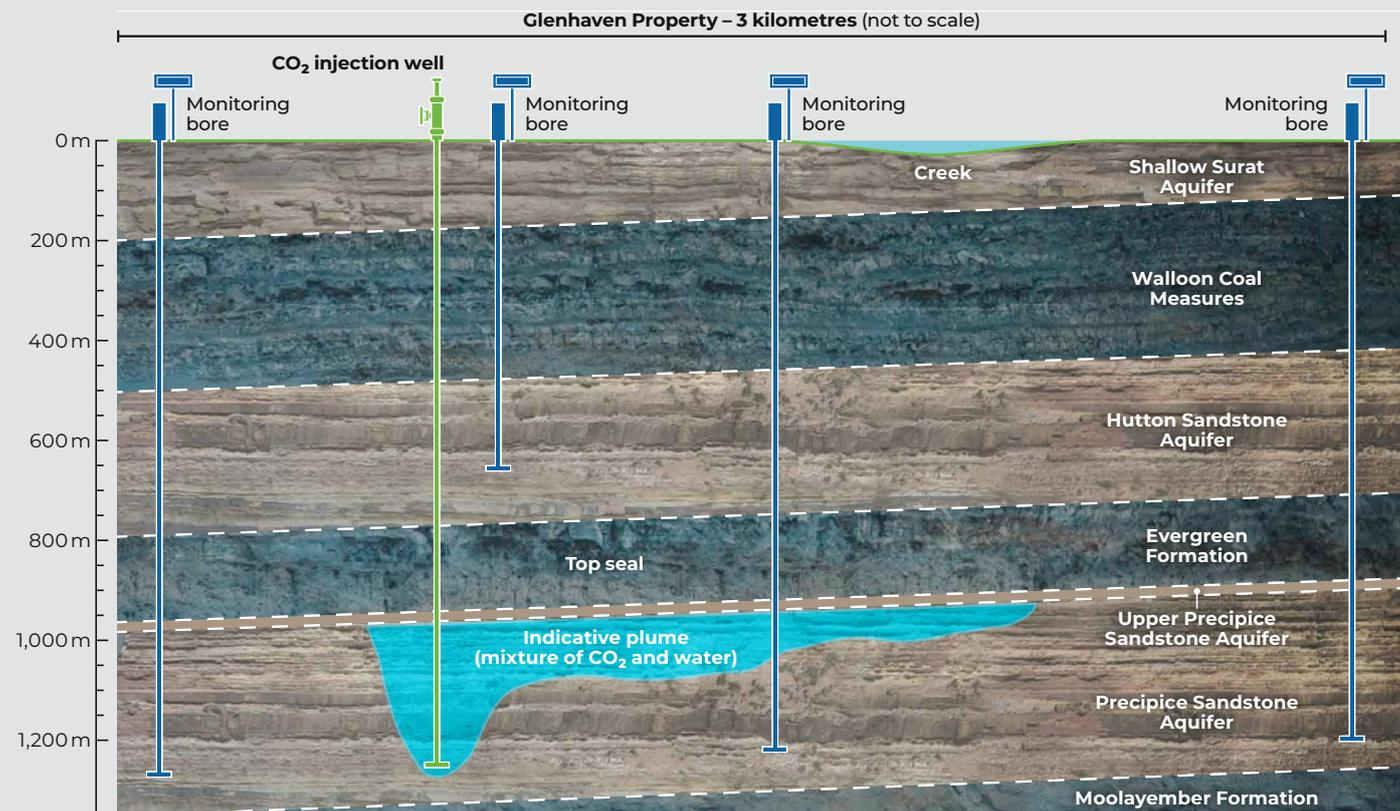
2) The right depth

At this location the Precipice Sandstone formation is at a depth of 1.2 kilometres. At this depth, the CO₂ remains in its liquid-like form and we are able to inject the smallest amount possible to allow for effective monitoring and assessment.

3) No overlapping activity

There are no competing surface-based activities with other resource operators:

- The study activities will be located to the south of the proposed Wandoan Coal Project mine footprint.
- There are no CSG wells within the study footprint (barring a small strip to the north of the property).



Suitable geology: Subsurface Cross Section of the Glenhaven, showing the Precipice Sandstone Aquifer, the Evergreen Formation Top Seal. The proposed Injection Well and projected CO₂ plume are also shown, along with the proposed monitoring wells which will be used to verify the extent of the plume

HOW CAN WE BE SURE THIS PROJECT WILL NOT ADVERSELY IMPACT THE COMMUNITY?

There are no water bores in the Precipice Sandstone aquifer within the proposed project site. The closest Precipice bores are between 6.4 and 18 kilometres away from project area.

Detailed data from our well studies and seismic surveys have been used to create a 3D model of the subsurface. The model allows us to identify the best locations for CO₂ injection and monitoring wells. The model allows us to predict the movement of CO₂ during and after the trial injection.

Our model shows that the injected CO₂ is predicted to remain within the trial site and beneath the Evergreen formation indefinitely. There is no reason to expect that any water bores including the Wandoan town water bores will be impacted by our project.

We are also taking a best practice approach by:

- Working with the best in this field

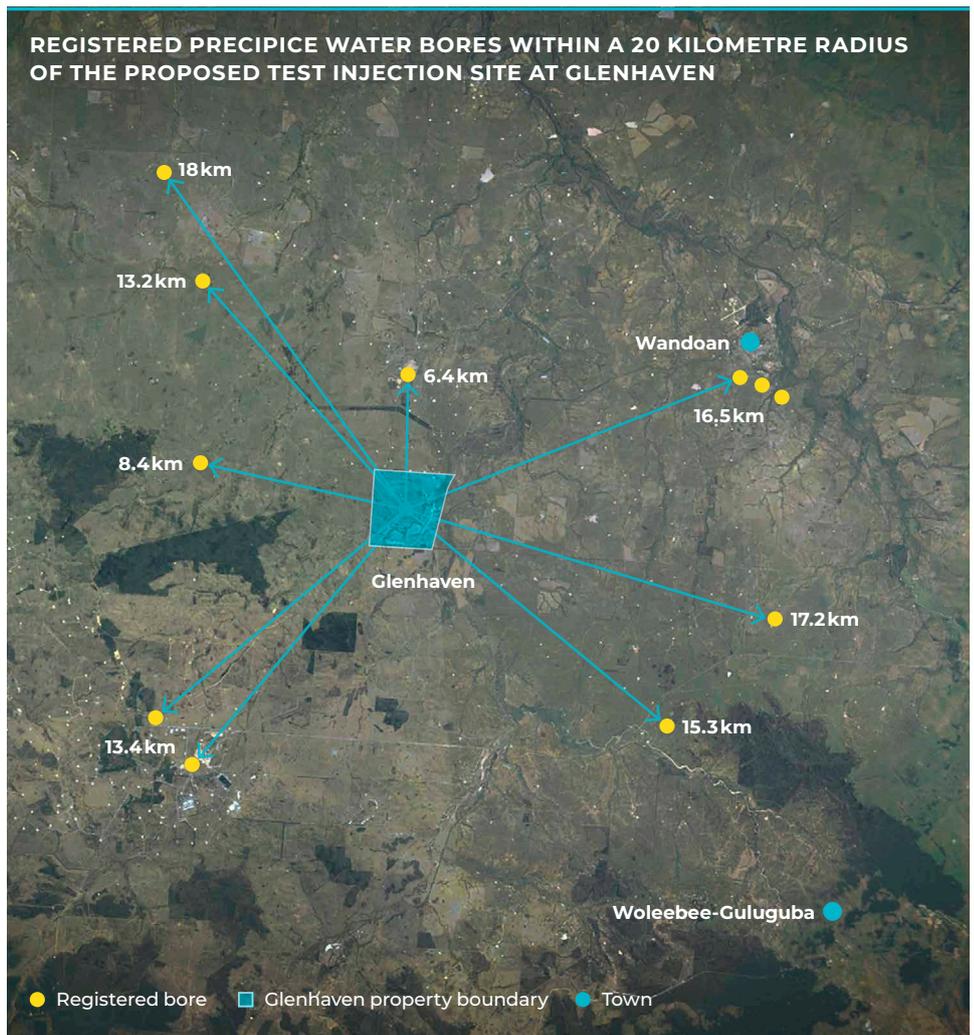
A significant scientific program is being carried out as part of the project feasibility study by a range of institutions including CSIRO, University of Queensland and the Australian National University. The overall project is also subject to technical oversight by a group of eminent academics.

- Actively involving the community

In the early stages of the feasibility study we conducted a community baseline survey to seek community feedback and establish a foundation for open and ongoing interaction with the local community. We have actively involved community and key stakeholders in our scientific studies including collecting water quality data and pastoral studies. We will continue to engage openly with the local community and listen to issues raised.

- Continuously assessing and reviewing our activity

We undertake regular independent, technical peer reviews of the geotechnical and stakeholder components of the project and its activities to ensure that a genuine best practice approach is being applied.



TECHNICAL DETAILS

HOW IS GROUNDWATER MANAGED IN THE SURAT BASIN

The Queensland Government Office of Groundwater Impact Assessment (OGIA) is tasked with monitoring and managing groundwater in the Surat Cumulative Management Area (CMA).

There are 22,500 water wells in the Surat CMA extracting:

- 203,000 megalitres per year for non-CSG purposes
- 65,000 megalitres per year for CSG activities.

Most of this water extraction is from shallow wells at a depth less than 800 metres with 90% of these wells (16,000) at a depth less than 250 metres.

LOCAL PRECIPICE BORES IN USE

In terms of the Surat Basin Carbon Capture and Storage Project:

- There are no registered Precipice Sandstone aquifer bores within five kilometres.
- There is one registered Precipice Sandstone aquifer bore within 10 kilometres.
- There are nine registered bores, including the Wandoan town water supply bore, within 10–20 kilometres.
- Within the footprint of the permit area, there are four wells identified as extracting water from the Precipice Sandstone aquifer. These will be individually sampled as the project gets under way to ensure that any changes are rapidly picked up.

The study project itself will have minimal requirements for water, with most water use being needed to undertake water sampling and monitoring activities, and small amounts for domestic use for staff working on site.

PROJECT TIMELINE

1

PRE-FEASIBILITY STAGE 2009–2014 (COMPLETED)

- Obtained a Greenhouse Gas Exploration Permit (EPQ7) from Queensland Government.
- Granted Environmental Authority (EA) to drill wells, acquire seismic survey data, and construct access roads and other facilities.
- Completed extensive analysis of existing Surat Basin data, the drilling of an exploration well, and the acquisition of new well data.

2

FEASIBILITY STUDY/FRONT END ENGINEERING DESIGN (FEED) STUDY STAGE 2014–2018 (CURRENT)

- Scientific verification work that the site is suitable for storing liquid CO₂.
- Undertaking environmental baselines and further rock properties modelling – no injection to take place at this stage.
- Examination of geological and environmental factors to provide a baseline for ongoing monitoring and comparison.
- Preparation and seeking permit for test injection (maximum 180,000 tonnes over three-year period only).
- Continued open engagement local community, non-government organisations and government agencies.

3

FINANCIAL INVESTMENT DECISION (FID)/ CONSTRUCTION AND COMMISSIONING STAGE 2018/19–2020/21* (FUTURE)

- Approval to construct a demonstration post-combustion capture (PCC) plant, linked to an existing power station in the region.
- Construction of CO₂ Capture Plant.
- Construction of in-field injection equipment at the site in Wandoan including:
 - One injection well into the Precipice Sandstone formation
 - 4 to 5 monitoring verification wells into the precipice and shallower e.g. Hutton formation, to detect for any potential leakage
 - Offloading facility with tankers to receive the liquid CO₂ from 4 to 5 trucks per day
 - Pipeline from offloading facility at the site to the single test injection well.

4

TEST INJECTION STAGE 2020/21–2023/24* (FUTURE)

- Commence injection of liquid CO₂ – maximum of 60,000 tonnes per year for three years.
- Continued monitoring and verification of the movement of CO₂ during the injection period.
- Post injection ongoing monitoring.

* Estimated



WHERE IS THE PROJECT?

The Surat Basin Carbon Capture and Storage Project is located in the Surat Basin in Queensland, 15 kilometres from Wandoan, which is approximately 400 kilometres north-west of Brisbane and is a local agricultural centre.

The Queensland Government has identified the Surat Basin as one of the most prospective locations for large commercial scale CO₂ storage potential. The Surat Basin is home to a number of coal-fired power stations and other emission sources making it an ideal location for a carbon capture and storage project.

