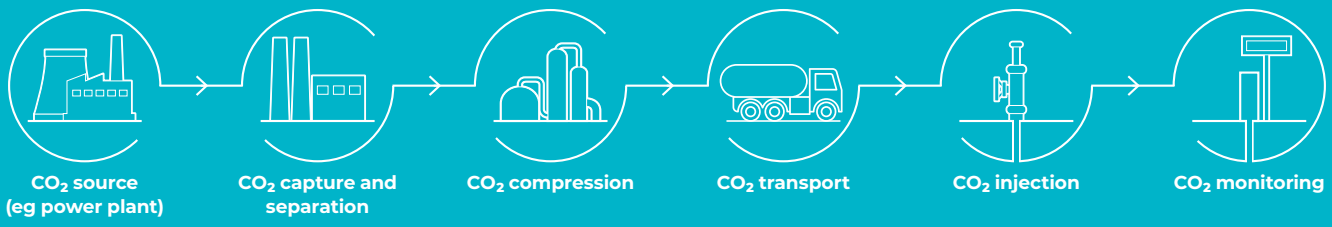
CTSCo's Surat Basin Carbon Capture and Storage Project

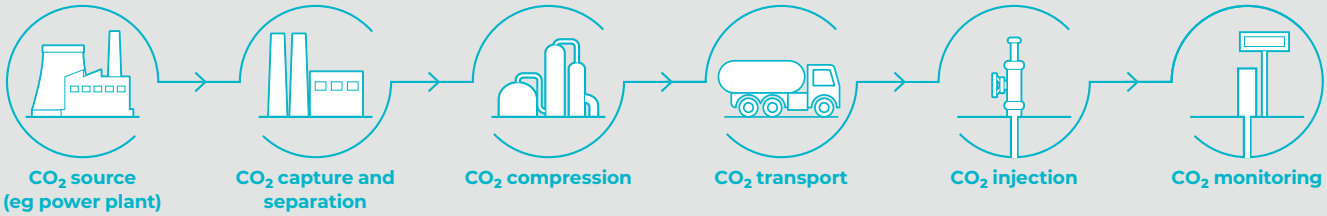
The Surat Basin Carbon Capture and Storage Project aims to determine the viability of industrial-scale carbon capture and storage in the Surat Basin. The project is funded by both industry and government.



CTSCo Carbon Transport and Storage Company

GLENCORE

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 CO_2 emissions produced by using fossil fuels in electricity generation and industrial processes, and stores this CO_2 underground. This prevents the CO_2 from entering the atmosphere and adding to global emissions.

Carbon capture and storage involves three major steps:

- **Capture:** the separation of CO_2 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 CO_2 is compressed and transported via pipelines, or in this case trucks, for geological storage.
- **Storage**: CO_2 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 CO_2 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 CO_2 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?

The work being undertaken for this Study is under a 'contract to deliver' to the Project Funders, that is LET Australia* and the Australian 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

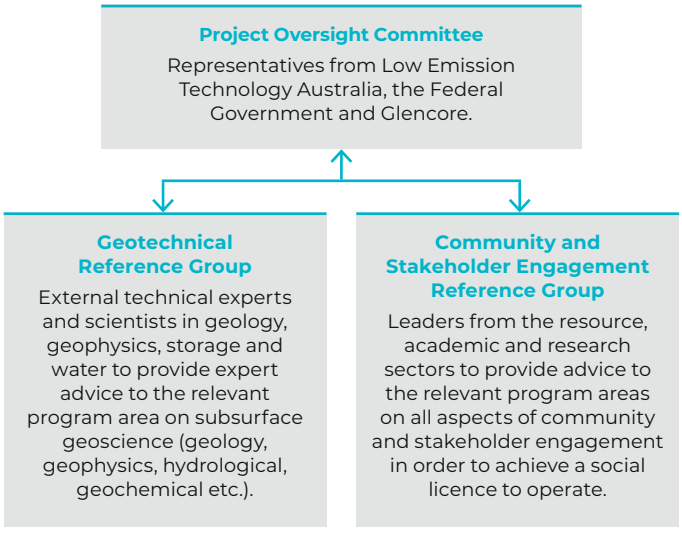
A Project Oversight Committee was established as part of the Funding Agreement to:

- 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 LETA, 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.



* LET Australia (Low Emission Technology Australia) formerly known as COAL21.

ABOUT THE PROJECT

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

WHAT IS THE OBJECTIVE OF THIS PROJECT?

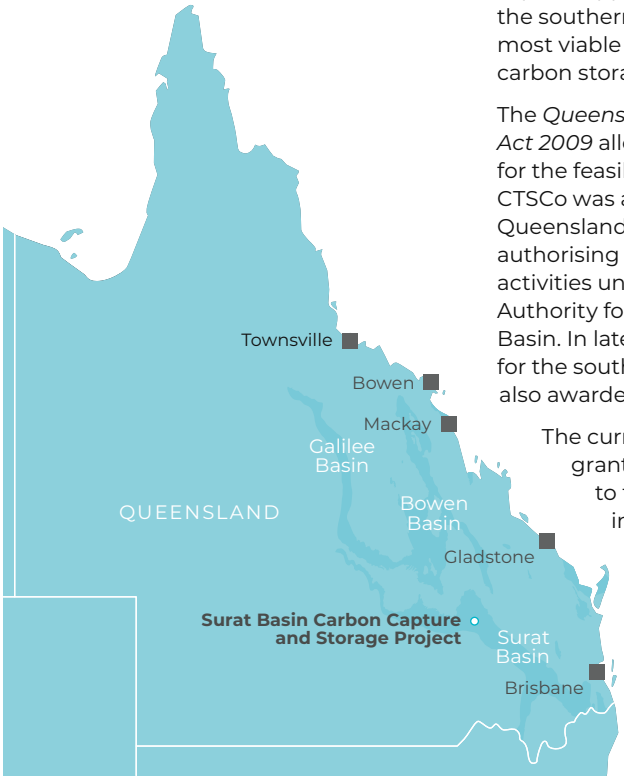
The project is intended as a first step toward large scale CCS within a Surat Basin hub, with emissions from multiple generators and other industrial sources being captured and safely stored.

CTSCo has identified three key project elements required to deliver an integrated long-term Surat Basin CCS project:

- Funding and construction of a demonstration-scale post-combustion capture (PCC) plant located at Millmerran Power Station;
- Regulatory approval, funding and deployment of a demonstration scale CO_2 storage project in the Surat Basin;
- Appraisal of the Surat Basin for an industrial-scale storage hub which will enable long-term sustainable economic growth for the region and contribute to affordable and reliable power generation for Queensland.

WHERE IS THE PROJECT LOCATED?

The Surat Basin is one of Australia's largest, and relatively untapped, energy resource areas, covering a geological area of approximately 300,000 square kilometres. It extends from central southern Queensland to central northern New South Wales.



CTSCo is focussed on activity in the central southern part of the region more than 400 kilometres from Brisbane. The project team is committed to working with the local community and the Government to ensure the benefits of the project, and its potential operations, are clearly demonstrated to enable long-term sustainable economic growth.

WHY THE SURAT BASIN?

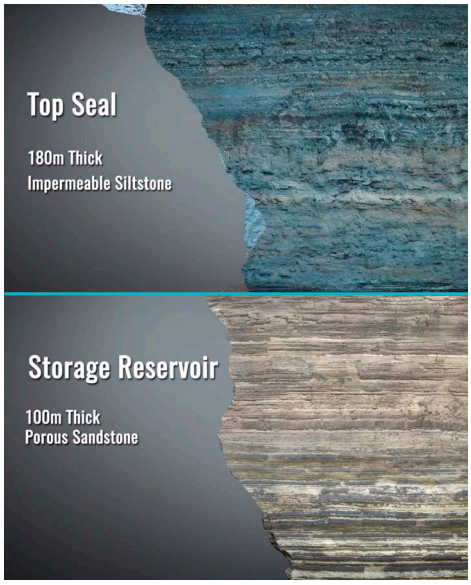
The Surat Basin supports a range of primary production activities and has traditionally been a coal region. Over the past decade, several billion dollars' worth of resources projects have been developed ranging from coal seam gas (CSG) and liquid natural gas (LNG) to wind farming and solar generation.[1]

The 2009 Nation Carbon Storage Taskforce report and the Queensland Government CO_2 Storage Atlas identified the Surat Basin as a key geostorage area. The report found almost three billion tonnes of CO_2 theoretical storage potential is available in the area. The Precipice Sandstone (aquifer) in the Surat Basin accounts for 1.3 billion tonnes of theoretical storage potential.

The Surat Basin is also home to a number of coal-fired power stations and other emission sources making it an ideal location for carbon capture storage. The University of Queensland's Surat Deep Aquifer Appraisal Project also identified the southern part of the Basin as the most viable potential area for large-scale carbon storage.

The *Queensland Greenhouse Gas Storage Act 2009* allows for exploration and testing for the feasibility of storage CO_2. In 2012 CTSCo was awarded a permit by the Queensland Government under the Act authorising carbon storage exploration activities under an Environmental Authority for the northern part of the Surat Basin. In late 2019 an exploration permit for the southern part of the Basin was also awarded.

The current permit that has been granted to CTSCo gives permission to find a suitable location to investigate storing CO_2. The permit does not authorise injection of CO_2. Injection of CO_2 will require further regulatory assessment and approval by the Queensland Government.



WHAT SITE CHARACTERISTICS ARE REQUIRED FOR SUCCESSFUL STORAGE OF CO_2?

There are two geological conditions that are necessary for carbon storage. The first is impermeable rock above the storage zone that seals the injected CO_2 in place.

Secondly there must be sufficient porous rock below this seal at a depth great enough for the carbon dioxide to remain in a liquid state when injected.

In this region, the Evergreen formation provides a thick layer of impermeable rock making it the ideal seal preventing upward movement of the injected CO_2 fluid, and the Precipice Sandstone provides suitable conditions for the injection of CO_2 because of its high porosity, thickness and depth below surface.

Extensive modelling undertaken by experts indicates the injected CO_2 would remain within this formation permanently with limited movement.

To ensure that there is no cross-contamination between the geological formations, and the carbon storage reservoir from CTSCo's proposed injection well, the highest industry standards and Queensland's comprehensive and strict environmental regulations would be applied to all bores to eliminate any risk. A combination of alloy steel and concrete barriers protects the bores from any damage while ensuring that the seal between the aquifers is not compromised.

1 SOURCE: Queensland Government's Surat Basin Regional Planning Framework – framework for a prosperous and sustainable community, 2011

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