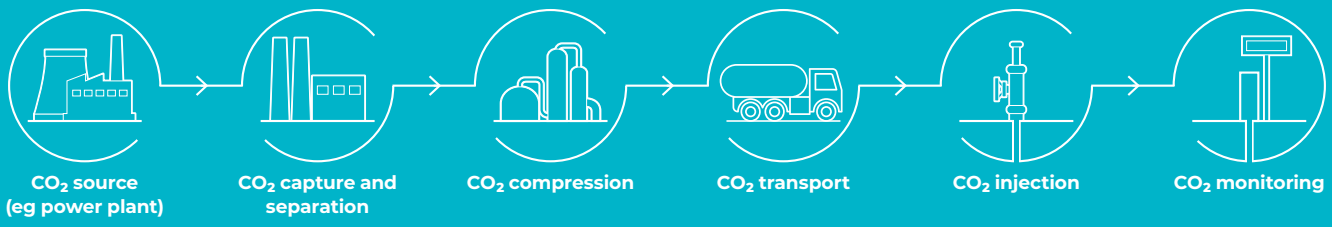
CTSCo's Surat Basin Carbon Capture Use and Storage Project

CTSCo's Surat Basin Carbon Capture Use 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 & Storage

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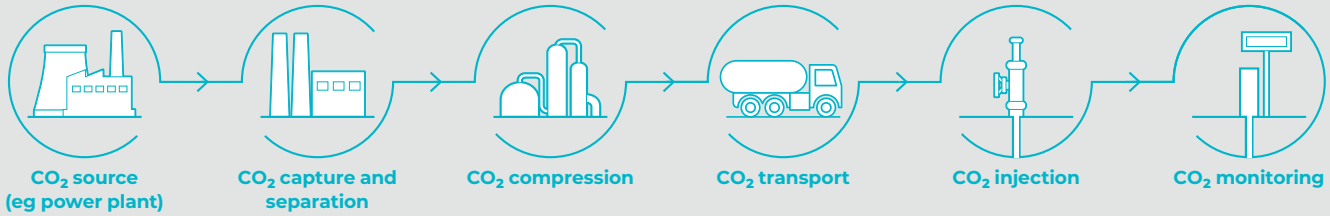
THE CARBON CAPTURE USE AND STORAGE PROCESS



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

Carbon capture use and storage (CCUS) is a group of technologies which can capture up to 95% 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.

CCUS 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.

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

WHY IS CCUS 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 fossil fuels will still provide 60%–75% of the world's primary energy by 2040. The IEA has said that CCUS will play a 'unique and vital role' in the global reduction of greenhouse gas emissions from the use of fossil fuels.

Australia's energy consumption is dominated by coal, oil and gas (76%)and coal accounts for about 54% of Australia's electricity generation, followed by gas (20%), wind (9%), solar (9%), hydro (6%), and oil (2%).[1]

IS THIS A PROVEN TECHNOLOGY?

CCUS 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 25 years.

THE ROLE OF CCUS IN AUSTRALIA'S LOW EMISSION FUTURE

As a significant energy exporter, Australia has an opportunity to play a role in low emission technology at large scale.

Domestically, there are three coal-fired power stations in South East Queensland that are less than 15 years old and have asset lives projected beyond 2050. CCUS offers a solution for continued operation of these plants with up to 90% removal of CO_2 emissions.

There are three key reasons why CCUS is important to Australia:

- Critical to reduce and remove Australia's industrial emissions – CCUS can remove >90% of CO_2 emissions from coal and gas power stations.
- Coal and LNG exports are material contributors to Australia's economic prosperity, CCUS can address Scope 3 emissions which are increasingly a part of maintaining licence to operate in Australia.
- Australia is the largest exporter of coal and LNG, therefore the leadership role for Australian industry and our international customers is to demonstrate viable low emission technology.

The CTSCo Project also provides an opportunity for Australia to develop expertise in CCUS from coal-fired power generation and assume a leadership role exporting this technology to international coal export customers. As well as supporting the reduction of emissions from the use of fossil fuels across a range of industrial sectors in Australia, the Project also provides a platform for producing low-cost hydrogen.

WHO IS INVOLVED IN CTSCO'S SURAT BASIN CCUS PROJECT?

Carbon Transport and Storage Corporation (CTSCo) Pty Limited is a wholly-owned subsidiary of Glencore, one of Australia's largest diversified natural resource companies.

The project team is working towards a final investment decision for the capture plant and initial storage injection by end 2021. The primary funding contributions for the $210 million CTSCo Project include:

- Glencore
- Low Emission Technology Australia (LETA)[2]
- Commonwealth Government; and
- Australian National Low Emissions Coal Research and Development Limited (ANLECR&D).

1 Source: Australia's Energy Statistics 2019–2020

2 LETA is formally known as COAL21

ABOUT THE PROJECT

CTSCo's Surat Basin Carbon Capture Use and Storage Project aims to demonstrate the viability of industrial-scale CCUS in the Surat Basin.

WHAT IS THE OBJECTIVE OF THIS PROJECT?

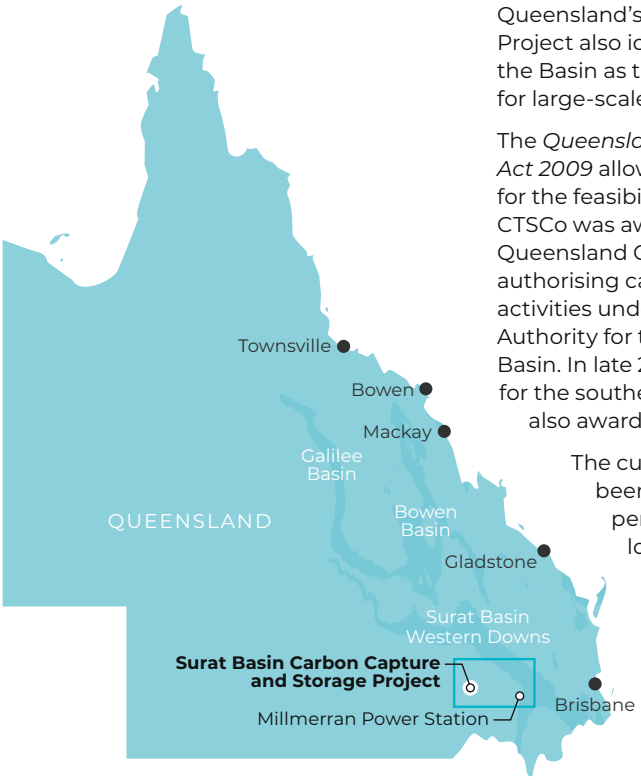
The Project is intended as a first step toward large-scale CCUS within a Surat Basin hub, with emissions from multiple generators and other industrial sources being captured and safely stored.

CTSCo has identified three key project elements required to deliver an integrated long-term Surat Basin CCUS 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, at a location west of Moonie. The project team is committed to working with 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?

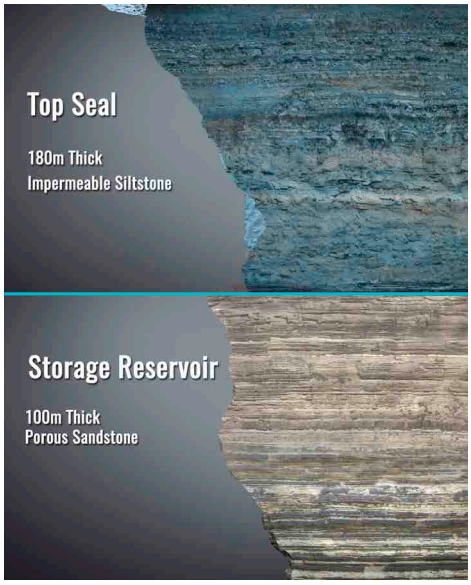
The Surat Basin supports a range of primary production activities and has traditionally been an agricultural region. Over the past decade, several billion dollars' worth of resources projects have been developed ranging from coal seam gas (CSG) and liquid natural gas (LNG) to wind farming and solar generation.[3]

The 2009 National 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 CCUS. 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. 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 that 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.

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

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