CTSCo
Carbon Transport & Storage

A GLENCORE Company

Glencore's CTSCo Project

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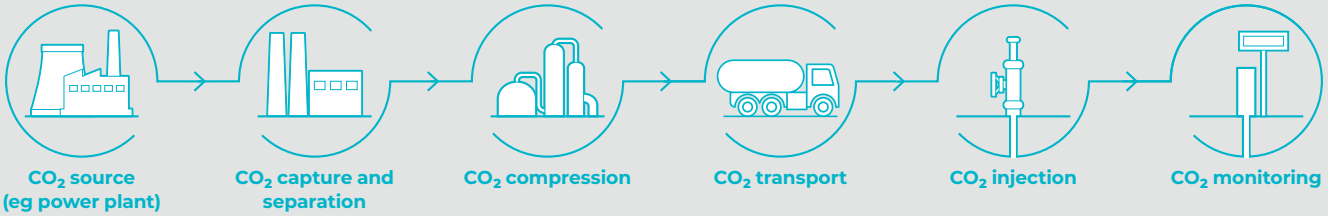
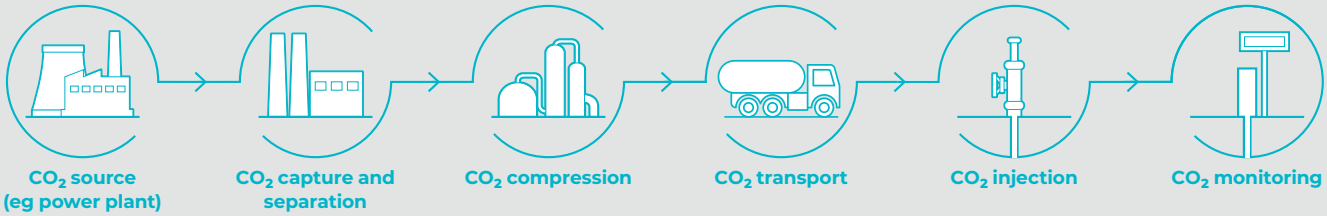


THE CARBON CAPTURE AND STORAGE PROCESS



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

Carbon Capture and Storage (CCS) is a group of technologies which can capture the vast majority of 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.

CCS 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, the CO_2 is compressed and transported for geological storage.
- **Storage**: CO_2 is injected into deep underground geological formations, where it is safely and permanently stored, often at depths of one kilometre or more.

WHY IS CCS 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.

Under the International Energy Agency's (IEA) Stated Policies Scenario – which assesses the stated policies of national governments around the world – fossil fuels will still provide 67% of the world's primary energy by 2040.

The IEA says that CCS will play a 'unique and vital role' in the global reduction of greenhouse gas emissions from the use of fossil fuels.

Australia's energy generation in 2021 was dominated by coal, oil and gas (71%). Coal accounts for about 51% followed by gas (18%), solar (12%), wind (10%), and Hydro (6%).[1]

IS THIS A PROVEN TECHNOLOGY?

CCS is not new. CCS combines proven technologies which have been in use for decades at industrial-scale. Globally, there are currently 30 large-scale operational projects already capturing and storing hundreds of millions of tonnes of CO_2, safely and efficiently.[2]

WHO IS INVOLVED IN GLENCORE'S CTSCO 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. The primary funding contributions for the $210 million CTSCo Project include:

- Glencore
- Low Emission Technology Australia (LETA)[3]
- Australian Government
- Marubeni Corporation
- Electric Power Development Co. (J-POWER), and
- Australian National Low Emissions Coal Research and Development Limited (ANLECR&D).

Australian Government

LETA
Low Emission Technology Australia

anlecr&d

Marubeni

J-POWER


West Moonie-1 Injection Well

1 Source: Australia's Energy Statistics 2020–2021; Table 14 Australian electricity generation by fuel type
2 Source: Source: http://status22.globalinstitute.com retrieved 24 October 2022
3 LETA was formally known as COAL21

ABOUT THE PROJECT

Glencore's CTSCo 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.

WHAT IS THE OBJECTIVE OF THIS PROJECT?

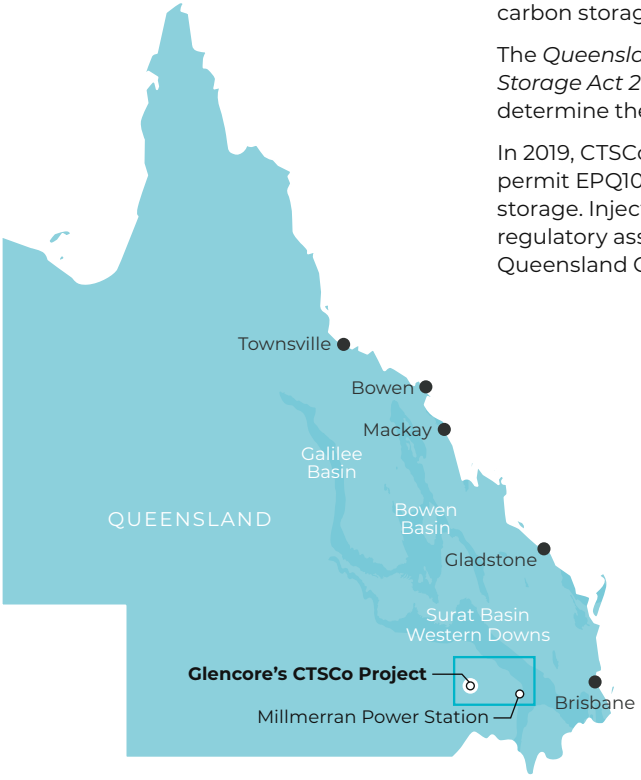
The Project is intended as a first step toward large-scale CCS within a Surat Basin hub, with emissions from multiple electricity generators and other industrial sources being captured and safely stored.

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, about 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?

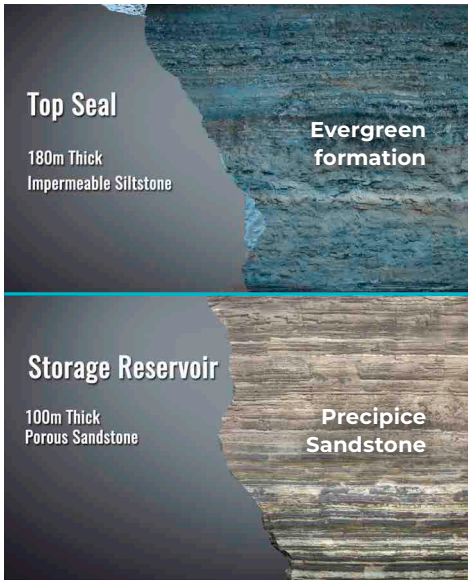
The Surat Basin supports a range of primary production activities and has traditionally been an agricultural region. Over the past decade, several billion dollars' worth of resources projects have been developed ranging from coal seam gas (CSG) and liquid natural gas (LNG) to wind farms and solar generation.[4]

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 3 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 University of Queensland's Surat Deep Aquifer Appraisal Project 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 to determine the feasibility of storage CO_2.

In 2019, CTSCo was granted the exploration permit EPQ10 to explore for potential CO_2 storage. 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 dioxide storage:

1. Impermeable rock above and below the storage zone that seals the injected CO_2 in place.
2. Sufficient porous rock below this seal at a depth great enough for the CO_2 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 indicates high confidence that the injected CO_2 would remain within this formation permanently with limited movement.

To ensure that the CO_2 remains within the CO_2 storage reservoir from CTSCo's proposed injection well, the highest industry standards and Queensland's environmental regulations would be applied to all wells to reduce risk. A combination of alloy steel and concrete barriers protects the wells from any damage while ensuring that the seal between the aquifers is not compromised.

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

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