

## FREQUENTLY ASKED QUESTIONS (FAQS)

### About the Project

**Q. Why are you doing this project here?**

- A.** In 2012 CTSCo was awarded a Greenhouse Gas Storage Tenement (GHG) at EPQ7 by the Queensland Government for the purpose of investigating CO<sub>2</sub> storage. Within this tenement we have access to 9km<sup>2</sup> of privately owned land held by Glencore (known as Glenhaven). The position of this property is ideal for a CO<sub>2</sub> test injection study like ours for the following reasons:
1. The Precipice Sandstone is highly permeable at that location. Consequently, CO<sub>2</sub> can be easily injected into the formation without requiring fracturing of the sandstone. The thick Evergreen Formation, located directly above the Precipice, also forms a competent seal to ensure the CO<sub>2</sub> remains in the formation where it is injected.
  2. The Precipice Formation is at a depth of 1.2km at the location. The benefit of this depth is twofold.
    - a) At this depth, the CO<sub>2</sub> remains in its liquid-like form where it mixes to form a solution with the formation water, and at a density of greater than 1.0.
    - b) At this depth we are able to inject the minimum volume of CO<sub>2</sub> to allow for effective monitoring. At a greater depth, a much larger volume of CO<sub>2</sub> injection would be required to effectively observe the injected fluid and to undertake the same scientific studies. Monitoring would also be considerably more difficult.

**Q. Who is involved in this project? Who is doing the work?**

- A.** The work is being carried by CTSCo (a wholly granted-funded Glencore subsidiary) funded by the Australian Coal Association Low Emissions Technology Ltd (ACALET), now known as COAL21, and the Australian Government. 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 through the Australian National Low Emissions Coal Research and Development (ANLECR&D) program. This work is also being done in consultation with the Queensland Government and relevant referral agencies such as the Office of Groundwater Impact Assessment (OGIA).

**Q. How do we know that the studies and activity are truly being done to the best standards in the world as you claim?**

- A.** 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 scientists and academics. This work has been undertaken through the Australian National Low Emissions Coal Research and Development (ANLECR&D) program.
- Q.** What we are doing differently as part of our approach is carefully taking our time to consider potential impacts and proactively involving stakeholders during this data collection and assessment phase to better understand how people on the land use and interact with the aquifer, rather than just solely relying upon an academic perspective.

- Q.** The outcomes from our studies and the detail on our program activities is also being done in consultation with the Queensland Government and relevant referral agencies such as the Office of Groundwater Impact Assessment (OGIA).
- Q.** We also undertake regular independent and internal technical peer reviews of the geotechnical and social license components on the project and its activities throughout its life has ensured that there is a genuine best practice approach being applied.
- Q. How much engagement has the project undertaken with the local community in relation to this project?**
- A.** The CTSCo project team have been actively engaging with the local community since 2015. The first phase of the engagement program was as a community baseline survey which provided insight into the current issues and concerns of the community and established a baseline position on their understanding of CCS.
- Q.** Following the release of the Community Baseline Survey findings to all participants, we held several one-on-one meetings with community influencers identified from the survey. These discussions informed the tailored engagement program designed for the Wandoan community.
- Q.** Over the past 24 months, CTSCo has held extensive one-on-one meetings with local community and landowners including precipice bore users within 15km of the Glenhaven property. In addition to these individual meetings, we have also held a public display at the Wandoan Community Centre, a community meeting hosted by the Wandoan District Liaison Committee, a presentation to the local conservation group, several meetings with the local state member (Colin Boyce) and a presentation to local regional NGOs.
- Q.** In addition to engaging with the local community, CTSCo has also been actively engaging with the regulator and referral agencies to share information and insights on scientific studies and activity. This has included regular interaction with the Department of Natural Resources, Mines and Energy Petroleum Assessment Hub, Compliance Unit, Water Policy Unit and other relative referral agencies such as the Office of Groundwater Impact Assessment (OGIA) and Geological Survey of Queensland.
- Q. Isn't this a project that just makes the coal industry and coal-fired power stations last longer?**
- A.** In order for Australia to meet its international climate change obligations (an obligation made by the Australian Government), a solution for carbon emissions from existing fossil fuel power generation and other large industrial processes is required. It will also help enable securing a future of reliable and affordable power for Queensland.
- Q.** Queensland is Australia's largest producer and exporter of high quality black coal and has the youngest fleet of black coal power stations in operation, mostly owned by the Queensland Government. These are important industries for all Queenslanders, so it's important every option to reduce emissions is carefully examined. The storage of CO<sub>2</sub> in the deep Surat Basin under Queensland's Greenhouse Gas Storage Act 2009 is one of those options. CTSCo was specifically established to examine the feasibility and safety of storing CO<sub>2</sub> in the deep Surat Basin geology under Queensland legislation.
- Q.** Australian coal is of very high quality and has lower emissions than many of its competitors. This project aims to demonstrate the CCS value chain deployment at minimum scale to gain Queensland stakeholder acceptance for low emissions fossil fuel use.

## CO<sub>2</sub> injection and water

**Q. Why are you putting acidic water in our precious aquifer?**

**A.** Injecting CO<sub>2</sub> into water does temporarily result in the lowering of pH (level 7). Close to the injection well, the pH is expected to be as low as pH level of 4 before the CO<sub>2</sub>/water solution is diluted. A pH level of 4 is similar to that of tomato juice. The area with injected CO<sub>2</sub> however, is quite small with no impact to water quality predicted outside the Glenhaven property boundary.

**Q. How can you guarantee me that CO<sub>2</sub> will stay -where you say it will and not interfere with my water bore?**

**A.** The Evergreen Formation that forms the seal above the Precipice Sandstone has been assessed, via a seismic survey, to contain no faults and consequently no leak path to shallower formations. The size of the injection area is also quite small with the plume modelled to stay within the property boundaries indefinitely. No existing Precipice water bores are located within 5km of the CO<sub>2</sub> plume boundary.

**Q. Won't this water within the injection site (that is the plume area) be lost to the community forever?**

**A.** A significant portion of the CO<sub>2</sub> water solution can be recovered to surface if required at some time in the future, the CO<sub>2</sub> removed and the water re-injected if the need arose.

**Q. Surely if this study is successful, you will want to continue to inject more CO<sub>2</sub> and what commitment can you give me that won't occur?**

**A.** The site at the Glenhaven property (owned by Glencore) would only be used for the test injection program. This assurance has been provided by Glencore. Future industrial scale injection would be carried out in locations further south where the Precipice is deeper and consequently can hold larger volumes of CO<sub>2</sub>.

**Q. Why don't you just do this study further down in the Surat Basin where there are less people, less water bores? Why not go there now?**

**A.** CTSCo holds the GHG tenement to undertake this activity where the Glenhaven property is located. The geology at this site also has the right characteristics and depth for storing the smallest amount of liquid CO<sub>2</sub> to assess our scientific assumptions. At this volume, we can be best assured that the stored CO<sub>2</sub> will not move off the property boundaries, will remain contained on the site indefinitely and will not compromise any community or private precipice bores. This location also allows the testing required to be conducted with the smallest amount of CO<sub>2</sub> possible.

## Differences to other industry activity

- Q. LINC Energy was a pilot project and it caused serious environmental harm by polluting the Darling Downs with hazardous contaminants. How can you assure people the same won't happen with your pilot project?**
- A.** CCS and Linc Energy's underground coal gasification (UCG) project are two completely different activities. UCG technology essentially burns a coal seam underground while injecting oxygen or air to sustain combustion thus extracting energy and chemicals using a complex, high temperature underground procedure. CCS is the process of capturing carbon dioxide from coal or gas-fired power stations and injecting it into existing sandstone pore space deep underground for storage where it remains.
- Q.** CTSCo is not a commercial enterprise to avoid any conflicts of commercial versus environmental interest. It is 100 percent grant funded and is obliged to report all its findings under Queensland's Greenhouse Gas Storage Act 2009 to its grant funders: the Australian Government, Australian Coal Association Low Emissions Technology/COAL21 and to the Queensland Government. CTSCo operates on an 'open book'/transparent basis with the relevant Queensland Government Departments.
- Q.** CTSCo has implemented comprehensive baseline environmental monitoring to ensure that any potential effects of its pilot activities can be compared against the baseline. Should a permit be approved for the exploration stage storage testing activities, extensive monitoring and verification is to be undertaken with continuous reporting to Queensland Government Agencies.
- Q.** Scientific studies associated with the CTSCo project are being undertaken by leading scientists, academics and researchers from universities and research institutions across Australia and the world. These include CSIRO, University of Texas, University of Queensland, Australian National University, Curtin University and CO<sub>2</sub>CRC.
- Q. There are a lot of CSG wells and activity in the region. How does CCS differ from CSG?**
- A.** Coal Seam Gas extraction involves drilling a coal seam between 600 and 800 metres deep, fracking (cracking open) the coal seams, with a mixture of water, sand and chemicals to release the existing water (not potable by definition) trapping the methane gas in the coal seams and extracting the water and methane gas thus released. Surplus water is treated through reverse osmosis and for pH adjustment and given to users OR reinjected into the same Precipice Sandstone being targeted for CCS.
- Q.** Carbon Sequestration does not involve the addition of anything, other than CO<sub>2</sub> captured from a power station (coal-based power generation at up to 90% capture in this case, but could be gas-based power generation, steel manufacture or cement manufacture), injected to an aquifer at a depth of greater than 800 metres so that it stays liquid. Injected at 1200 metres or more and at the natural pressure down there of 1850 psi and natural temperature of 60 degrees Celsius, the CO<sub>2</sub> has a density of greater than 1 so that it tends to sink when combined with water over a period of time.
- Q.** CCS does not involve fracking, and no water is extracted unless just for mixing and re-injection at the same site. CO<sub>2</sub> is a non-toxic substance that we breathe, drink, and is essential to human life in a dilute form, it also has industrial and surgical uses.
- Q.** Water with CO<sub>2</sub> untreated for pH (at a level of 7) is slightly acidic (untreated a pH of about 4) but this subsides quite quickly through other reactions.

- Q. If the water within the test injection area (i.e. the plume) is taken back to the surface the CO<sub>2</sub> 'evaporates' like opening a carbonated water bottle and the water is recoverable with minor treatment, so it is not lost to the national estate, if it should ever be required sometime in the future.