Moomba Carbon Storage project

A project for our time and for future generations

Santos origin BEACH PETROLEUM

Delivering CO_2 solutions

Capturing and securely storing CO_2 (the most significant greenhouse gas) deep underground is one of the most practical and efficient responses to combating climate change.

Santos' Moomba Carbon Storage Project (MCS) could eventually store up to 20 million tonnes of CO_2 per annum and 1 billion tonnes over the life of the project.

MCS can deliver Australia its first large CO_2 abatement option, providing the storage solution which will see CO_2 from sources in eastern Australia transported to central Australia and permanently stored underground.

MCS will establish Australia as a leader in climate change initiatives and will provide a crucial enabler for the development of clean coal technology in eastern Queensland and New South Wales' Hunter Valley.

What is CCS?

Carbon capture and storage (CCS) is a technology option which aims to reduce greenhouse gas emissions from point sources such as coal-fired power stations and major industrial plants.

CCS involves the capture and separation of CO_2 at its source, transportation via dedicated pipelines to a storage location and injection into deep geological reservoirs.

CCS is one of the few large-scale options to lower greenhouse gas emissions. Indeed the International Energy Agency has estimated that CCS could deliver the second largest component of emissions abatement after energy efficiency.

The project

Moomba Carbon Storage involves three main phases, ultimately delivering a regional carbon storage hub for eastern Australia.

Phase 1, will demonstrate the technical and economic feasibility of storing CO_2 in depleted oil and gas fields in the Cooper Basin, in central Australia. It involves the capture of all CO_2 separated as part of the gas processing operations at Moomba, transporting that CO_2 to a designated site and injecting the CO_2 stream into partially depleted oil reservoirs.

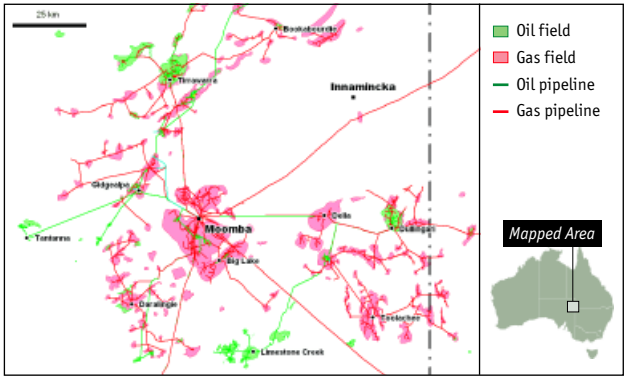
The injected CO_2 will re-pressurise the reservoirs and sweep residual oil left behind by traditional recovery methods (this is called enhanced oil recovery). Over time the oil is gradually exhausted, at which point the extraction wells are capped. Injection continues and the CO_2 is permanently stored and monitored in the underground reservoir.

This phase, which could commence as early as 2010, will capture and permanently store 1 million tonnes of CO_2 each year.

The second phase focuses on building capacity and confidence in the technology as increasing volumes of CO_2 are moved towards Moomba. MCS would link to the development of a clean coal power generation project in eastern Queensland or/and New South Wales' Hunter Valley. CO_2 captured from that project would be transported towards Moomba utilising existing infrastructure wherever possible.

Assuming success in the first two phases, carbon capture and storage will become commercial reality in the final phase of the project. Phase 3 will deliver Australia's first common-user carbon storage hub at Moomba. Significant quantities of CO_2 would be captured from key point sources in New South Wales, Queensland and South Australia. Dedicated CO_2 pipelines would be built to connect these emitters to the Moomba carbon storage hub. The CO_2 would be distributed to designated sites and stored in depleted oil and gas reservoirs or deep aquifers.

Moomba processing facility, central Australia.



Cooper Basin oil and gas fields and pipline infrastructure

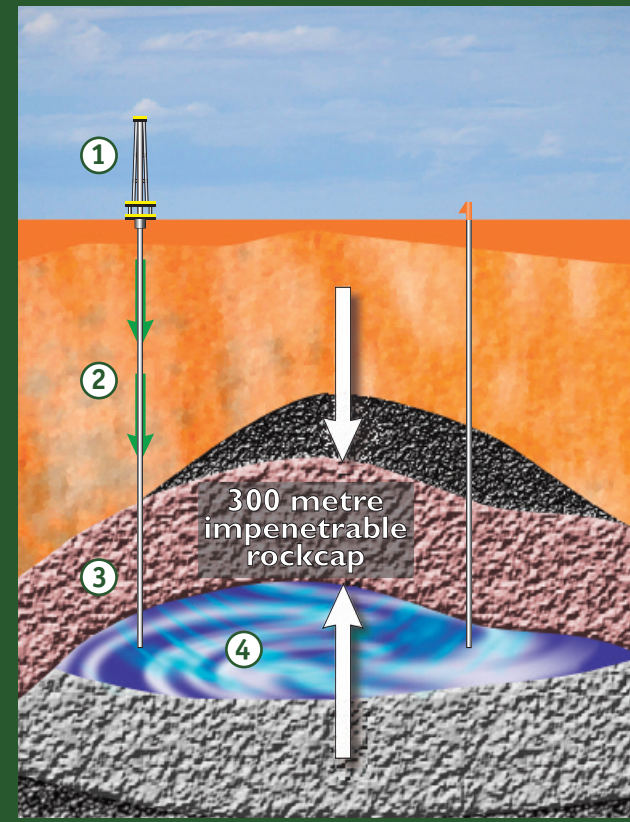
Why the Cooper Basin and Moomba?

Moomba Carbon Storage (MCS) represents a unique and compelling opportunity to implement an early (2010), full-cycle (capture to storage), commercial-scale (> 1 million tonnes per annum) carbon capture and storage project in Australia.

1. The Cooper Basin oil and gas fields, coupled with the Moomba processing plant, are Australia's largest onshore resource project representing $8billion of investment. The Cooper Basin geology is very well-understood, with over 2300 wells, 220 fields and nearly 40 years of production history.
2. Initial storage will be in depleted oil and gas fields with subsequent scale-up into saline aquifers.
3. MCS is ready-to-go. All components are in one place under aligned commercial ownership.
4. The Cooper Basin and Moomba are centrally located with respect to major existing pipeline corridors in Qld, NSW and SA, yet remote from major population centres.
5. Legislation exists in SA to allow this project to commence now.
6. The Moomba Carbon Storage project will store up to 20 million tonnes of CO_2 per annum for up to 50 years.

Storage of CO_2 in the Cooper Basin

1. Once the CO_2 has been captured from the source it will be compressed to reduce it to a super-critical liquid ready for transportation.
2. The "liquid" CO_2 is then injected at high pressure into the subterranean reservoir thousands of metres underground.
3. An impenetrable rockcap will hold the CO_2 in place.
4. The injection wells are capped and over centuries the CO_2 will combine with water to form harmless minerals.

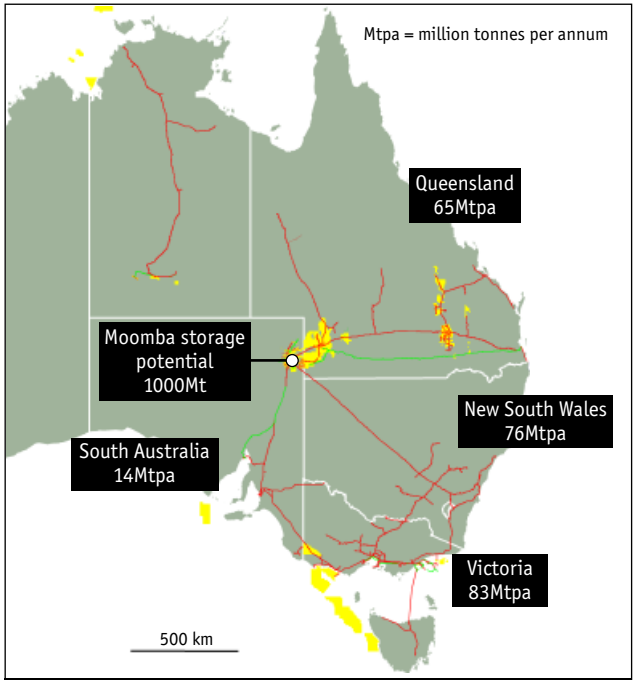


Underground CO_2 storage solution more than 2.5 kilometres below the surface.

Managing any risks

The risk of CO_2 leakage from the depleted Cooper Basin oil and gas reservoirs is extremely low. These reservoirs have trapped hydrocarbons for millions of years and are expected to similarly entrap CO_2. In addition, any potential for leakage will be managed through careful storage and site design backed up with rigorous early detection mechanisms. The Cooper Basin has been recognised by Geoscience Australia and others as an ideal geosequestration site because of the highly impermeable caprocks, geological stability, absence of leakage paths and trapping mechanisms.

In terms of surface facilities, Santos has been safely producing, processing and transporting gas in the Cooper Basin for nearly 40 years. In addition, Santos has been routinely injecting and withdrawing gas from a major underground gas storage facility at Moomba for over 15 years.



Stationary energy emissions sources
Carbon infrastructure develops around existing gas infrastructure

Who's involved?

The Moomba Carbon Storage project is being developed by Santos as the operator of the Cooper Basin Joint Venture. The other parties involved are Beach Petroleum and Origin Energy. This team has decades of oil and gas exploration and production experience coupled with a proven track record in major project management.

Santos is a leading Australian energy company with the experience, knowledge and vision to deliver Australia's first commercial-scale CO_2 storage project at the Moomba gas hub.

Santos has sought a Commonwealth government grant to support the development of the demonstration phase of MCS.

"At Santos we recognize one of our key environmental responsibilities is to pursue strategies that address the issue of greenhouse gas emissions."

Santos Greenhouse Policy, 2004.

For further information contact:

General enquiries
Mike Congreve
Santos Limited
60 Flinders Street, Adelaide
South Australia
+61 (8) 8116 7613

Media enquiries
Matthew Doman
Santos Limited
60 Flinders Street, Adelaide
South Australia
+61 (8) 8116 5260

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