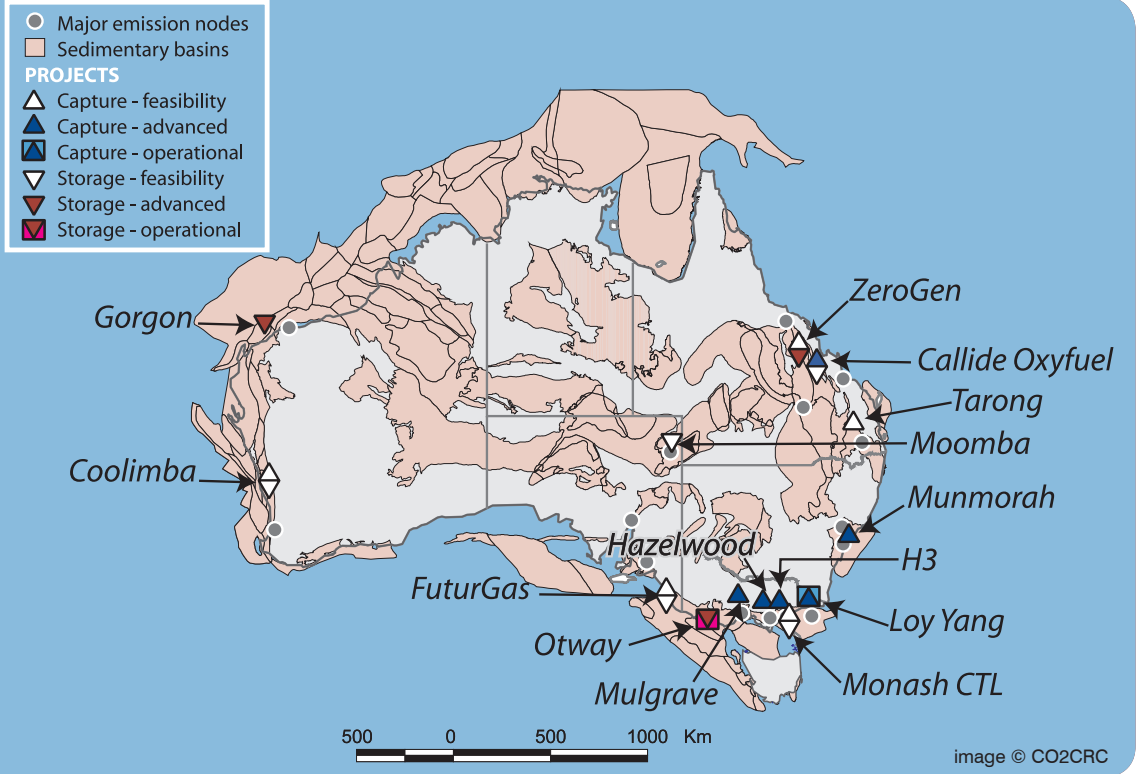


Decreasing carbon dioxide emissions from major stationary sources is firmly on the Australian agenda and carbon capture and storage (CCS) is seen as a vital part of the national mitigation portfolio. There are now a number of CCS demonstration projects underway or planned and several major commercial CCS projects proposed for Australia.



## Callide Oxyfuel Project, Queensland

This demonstration project involves conversion of an existing 30MW unit at Callide A (currently underway) with power generation and capture of CO<sub>2</sub> commencing in 2010. The second stage of the project will involve the injection and storage of about 60 000 tonnes of captured CO<sub>2</sub> in saline aquifers or depleted oil/gas fields over about three years, planned to commence in 2011. Cost estimate is A\$206 million. The project involves CS Energy, IHI, Schlumberger, Mitsui & Co, J-Power, and Xstrata, with extra funding from ACA and the Australian and Queensland Governments

## CO2CRC Otway Project, Victoria

This is Australia's most advanced storage demonstration project. Injection of CO<sub>2</sub> from a nearby gas well initially into a depleted gas field at a depth of 2km began in April 2008 at a rate of about 150 tpd, with an injection target of up to 100,000 tonnes of CO<sub>2</sub> over two years. A major program of monitoring and verification has been implemented. The A\$40 million Project, which is supported by 15 companies and 7 government agencies, involves researchers from Australia, New Zealand, Canada, Korea and the USA. CO2CRC Pilot Project Ltd, the operating company, includes AngloCoal, BHP Billiton, BP, Chevron, Schlumberger, Shell, RioTinto Solid Energy, Woodside and Xstrata. Additional financial support is provided by the Australian Government (RET), the Victorian Government and the US DOE.

## Coolimba Power Project, Western Australia

Construction of Aviva Corporation Ltd's 2x200MW coal-fired base-load power stations is proposed to begin in the second half of 2009 and be completed by 2012. The plant will be built ready for conversion to CO<sub>2</sub> capture. Sequestration sites are being sought for the storage of about 3Mtpa of CO<sub>2</sub> for up to 30 years with the involvement of CO2CRC and ARC Energy.

## FuturGas Project, South Australia

Hybrid Energy Australia is researching the development of the carbon dioxide storage component of the FuturGas Project – an energy conversion development involving the gasification of lignite to syngas for the production of synfuels. It is proposed that the CO<sub>2</sub> captured post-gasification will be stored in the Otway Basin to the south of the lignite resources. A feasibility study and an environmental impact study will be completed by 2011. It is hoped the project will become operational by 2016.

## Gorgon Project, Western Australia

Chevron (operator), Shell and Exxon are planning a major sequestration project linked to the Gorgon LNG Project. The separated CO<sub>2</sub> will be injected under Barrow Island to a depth of about 2.3km, with injection of 3.3 million tonnes of CO<sub>2</sub> per year. A total of 125 million tonnes will be injected over the life of the project. The construction phase is planned to commence in late 2009 and take about five years. A data well has been drilled and a major study of the subsurface is underway.

## Hazelwood Carbon Capture Project, Victoria

Work is underway to retrofit a post-combustion capture plant to International Power's Hazelwood Power Station that will capture and chemically sequester CO<sub>2</sub> at a nominal rate of 10,000 tpa of CO<sub>2</sub>. Capture will commence late 2008. This project is partly funded by the Australian Government under LETDF and the Victorian Government under ETIS LSDP.

## Latrobe Valley Post Combustion Capture Project (LVPC), Victoria

This project is developing technologies for post-combustion capture from coal-fired power stations in the Latrobe Valley. The LVPC involves International Power, Loy Yang Power, CO2CRC and CSIRO and is partly funded by the Victorian Government under the ETIS Brown Coal R&D fund. It comprises work at the Hazelwood Power Station within the CO2CRC H3 Capture Project and research activities by CSIRO at Loy Yang.

## CO2CRC H3 Capture Project, Victoria

This project, led by CO2CRC, is based at International Power's Hazelwood plant and overlaps with the Hazelwood Capture Project. CO2CRC will test a range of solvents and different process configurations using the solvent post-combustion capture plant. In addition, post-combustion techniques using adsorbent and membrane technologies will be developed using two purpose-built rigs.

## Loy Yang Project, Victoria

A CSIRO mobile pilot post-combustion capture facility has begun operation at Loy Yang Power Station as part of the LVPC Project. It is capturing around 1000 tpa of CO<sub>2</sub>. The facility is investigating a range of solvent technology for CO<sub>2</sub> capture.

## CO2CRC Mulgrave Capture Project, Victoria

CO<sub>2</sub> emissions will be captured from HRL's research gasifier at Mulgrave in a pilot-scale capture project by CO2CRC. The capture technologies will be evaluated to identify which are the most cost effective for use in a coal gasification power plant. Partners include CO2CRC and HRL with funding from the Victorian Government under the ETIS Brown Coal R&D program.

## Moomba Carbon Storage Project, South Australia

This project is currently at the early feasibility stage, with the objective of establishing a regional carbon storage hub in the Cooper Basin. The proposed demonstration phase, commencing in 2010, will involve the capture of CO<sub>2</sub> from existing gas processing facilities and injecting one million tonnes of CO<sub>2</sub> to re-pressurise oil reservoirs for enhanced oil recovery. Partners in this project include Santos and Origin.

## Monash CTL Project, Victoria

This proposed project involves gasification of Latrobe Valley brown coal to produce syngas, with a shift reaction and extraction of excess CO<sub>2</sub> before the syngas is converted into a range of liquid products. The CO<sub>2</sub> would be compressed for transport via pipeline to a suitable storage site (potentially off-shore Gippsland Basin). A full scale plant (70 000 barrels per day) is projected to take ten years from conception to full production and would require injection and storage of approximately 15 million tpa of CO<sub>2</sub>. The project is currently in the concept assessment phase. Monash Energy is a joint development of Anglo American and Shell Gas and Power.

## Munmorah PCC Project, New South Wales

This research scale pilot project will investigate the post combustion capture (PCC) ammonia absorption process, and the ability to adapt it to suit Australian conditions. Capture of up to 4000 tonnes of CO<sub>2</sub> for the pilot phase, using a mobile rig, is expected to begin by late 2008. Partners involved in this project are Delta Electricity, CSIRO and the ACA. A larger scale demonstration project, incorporating geological storage, may be commenced around 2011.

## Tarong PCC Project, Queensland.

CSIRO and Tarong Energy will install a post-combustion capture pilot plant using an amine-based solvent at Tarong Power Station near Kingaroy, Queensland. The pilot plant will capture 1500 tpa of CO<sub>2</sub> over a two-year research program beginning in 2009. The cost of the project is \$5 million.

## ZeroGen Project, Queensland

The Queensland Government, ACA and industry partners Shell Development and Zerogen propose a two stage coal gasification and CCS project "ZeroGen Mark II". Stage 1 (demonstration) will be a 80 MW net plant located near Rockhampton and is expected to be operational by 2012. The CO<sub>2</sub> will be captured and transported approximately 220km by pipeline for storage in the Denison Trough. Stage 2, a 300 MW net coal gasification plant, is proposed to come online by 2017.

The Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) is one of the world's leading collaborative research, development and demonstration organisations focused on greenhouse gas technologies, particularly the capture of carbon dioxide from stationary industrial sources and its geological storage.

### Core industry participants:

Anglo American, ACARP, BHPBilliton, BP, Chevron, ConocoPhillips, Mitsui, NZ Resource Consortium, Origin Energy, Queensland Energy Resources Ltd, Rio Tinto, Sasol, Shell, Schlumberger, Solid Energy of New Zealand, Stanwell Corporation, Woodside and Xstrata, Queensland Government – Department of Mines and Energy.

### Core government participants:

Geological Survey of Queensland, NSW Department of Primary Industries, Victorian Department of Primary Industries, WA Department of Industry and Resources, Foundation for Research, Science and Technology, NZ and Korea Institute of Geoscience and Mineral Resources.

### Core research participants:

CSIRO, Curtin University of Technology, Geoscience Australia, GNS Science, Monash University, University of Adelaide, University of Melbourne and University of New South Wales, and other financial contributors.



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