

Message from the CEO ●●●●

This is my first newsletter message as CO2CRC's Chief Executive. I have so far managed to meet many of our researchers, staff and industry partners, but not all. Our annual Research Symposium, now only weeks away, will be a good opportunity to meet anyone I may have missed.

It has been a very significant first few months for me. The conclusion of Stage 2B of the Otway Project is cause for considerable celebration and I was able to visit the site while operations were still underway. It was terrific to see our scientists and engineers working around the clock to complete the experiments. The research represents world-leading technology development and is right at the cutting edge of reservoir evaluation for carbon storage. Results from this research will have a profound impact on downhole storage assessment technology and thus on CCS assessments for proposed storage locations around the world.

The development of capture technology is highly competitive with a number of technologies competing to be the leading applications in 2020 and beyond. CO2CRC is playing well in this space, with a patent recently granted for CO2CRC's UNO MK3 precipitating solvent technology. The potential energy savings and environmental benefits of this approach to capture are significant and when combined with some of the new developments in contactors, large capital and operating cost reductions can be predicted. The next phase of demonstration at Hazelwood power station is an exciting step on the demonstration commercialisation pathway. I should also point out that we have a wide-ranging portfolio in capture technologies with many developments that can be trialed using the pilot plant facilities at Hazelwood.

The Government's proposed carbon pricing arrangements are before Parliament and while CO2CRC supports the need for action on climate change and the establishment of a price on carbon, we are concerned that CCS has not received the attention that other emission reduction options have. CCS will be vital to meeting our 2050 targets but the long lead times for CCS projects means that we need to be planning and funding projects now. Sometimes it is challenging to get this message across when politics is involved but from a technical and economic perspective it is clear that both renewable energy and CCS should be considered equal partners in the strategy to reduce Australia's carbon emissions. This is not a problem confined to Australia; the message was reiterated at the recent CSLF meeting in Beijing by the International Energy Agency.

Finally, I have always been highly impressed by the standard of the science at the annual CO2CRC Research Symposium. This year I am looking forward to seeing CO2CRC's research progress from inside the tent and I hope to see you there as well.

Dr Richard Aldous

Chief Executive



Richard Aldous
Chief Executive

“The conclusion of Stage 2B of the Otway Project is cause for considerable celebration”

The CO2CRC Otway Project ●●●●

A team of over thirty CO2CRC researchers and many helpers completed Stage 2B of the CO2CRC Otway Project in September. The team successfully pulled off a remarkable series of sub-surface investigations that are right at the cutting edge of storage science research.

Stage 2B was a sophisticated A\$10 million research program that will significantly add to the progress of carbon capture and storage (CCS) technologies around the world.

After eleven weeks of continuous operations, the international research team led by CO2CRC concluded a sequence of five carefully prepared tests which will inform commercial CCS projects, producing tools and techniques to assess the capacity and security of geological carbon storage worldwide.

The aim was to develop a way to measure the proportion of injected gas trapped permanently in the water-filled reservoir rock after injection. The project involved drilling and instrumenting a 1500 metre well, followed by a complex series of operations including injections, extractions and sampling over several months.

Normally two or more wells would have to be drilled to assess a possible storage site. Using the methods tested at the Otway Project, storage capacity can now be assessed using the same well used to inject the gas, eliminating the need for separate monitoring wells and saving US\$5m or more.

The experiments took three years to develop and included tests for hydraulic pressure, organic and noble gas tracers, thermal properties, residual gas saturation and CO₂ dissolution.

Instrumental to the success were leading scientists from Lawrence Berkeley National Laboratories, CSIRO and Geoscience Australia, as well as researchers and technicians from Australia, The USA and Korea.

There are many months of serious work and exciting interpretations ahead; planning for Stage 2C of the Otway Project is now also in full swing.

A first taste of the results from Stage 2B will be available at this year's CO2CRC Research Symposium. Dedicated sessions to discuss the complex operations, data from the individual experiments and Stage 2C and beyond will also be held.

» [Progress and photos from the 2B tests](#)

» [Media release from Ministers Carr and Ferguson](#)

Matthias Raab

Program Manager CO₂ Storage



Continuous operations were a feature of Stage 2B at the Otway Project



Storage research program ●●●●

CO2CRC, the Victorian Government and the University of Melbourne have collaborated to establish the new Victorian-based Centre for Geological Carbon Storage.

The Centre will be a focus for CCS research and development in Victoria, as well as high level education in CCS-related disciplines.

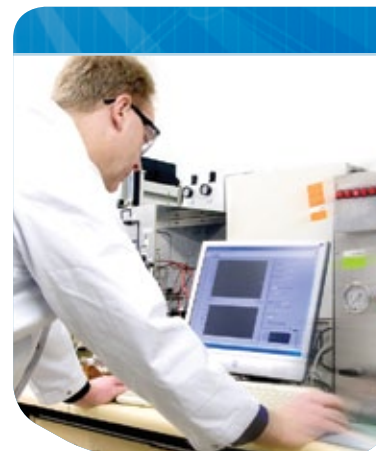
Building the skills base for a future CCS industry in Australia will be essential for meeting our greenhouse gas reduction targets. Engineers and scientists with the right skills will be needed to allow CCS to play its part in Australia's climate mitigation measures.

Victoria has been a hub for much of CO2CRC's research for many years, including world-leading demonstration projects such as the CO2CRC Otway Project and capture demonstration projects in the Latrobe Valley.

The University of Melbourne is an ideal base for the Centre, as CO2CRC will be able to build on CO2CRC facilities, researchers and students already there. The Centre will be able to draw on leading academics and tertiary students, especially postgraduate students, to build Australia's capacity in CCS skills.

Industry, government and research organisations will be able to partner with the Centre in order to contribute and benefit from its work.

For CO2CRC, the Centre is both a logical move and a significant step that will add to Australia's credentials as a world leader in CCS science.



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Capture research program ●●●●

CO2CRC's UNO suite of carbonate capture technology has been further recognised through the awarding of two national phase patents, one in Australia and the other in the USA. These patents cover both post and pre-combustion applications and lay the foundations for the latest technology development, UNO Mk 3, which has recently been filed as an international (PCT) patent application.

UNO Mk 3, developed by the CO2CRC solvent team at The University of Melbourne, uses potassium carbonate, an environmentally benign compound similar to baking soda, to capture carbon dioxide from a flue gas stream. Studies have shown that the UNO Mk 3 system can potentially reduce capture costs by 15 to 20 per cent.

Following a grant from Brown Coal Innovation Australia (BCIA), CO2CRC is currently modifying and relocating an existing pilot scale capture plant to trial UNO Mk 3 under industrial conditions at International Power's Hazelwood power station. The aim is to make the system 'power station ready'.

The patent will allow CO2CRC to export highly innovative technology developed by the Centre that has both significant cost savings and environmental benefits while cementing Australia's role as a leader in CCS development.

The \$4.2 million project will run for three years and includes a computer model of the process to facilitate scale-up, along with large-scale designs and costs for equipment items.

The project builds on CO2CRC capture demonstration projects undertaken in pre- and post-combustion capture at Hazelwood and Mulgrave, supported by the Victorian Government through their ETIS program and CO2CRC partners. The projects assessed three capture technologies for each application, established significant cost savings through new systems and heat integration, and provided the basis for assessing capture costs for new technologies.

» [Further information: Professor Dianne Wiley, dwiley@co2crc.com.au](mailto:dwiley@co2crc.com.au)



This solvent capture rig is being reconfigured for UNO Mk3 trials

2011 CO2CRC CCS School

Post-graduate students, early career scientists and policy-makers heard from experts on carbon capture and storage (CCS) science and technology at the 2011 CO2CRC CCS School, held at the University of Melbourne in September.

The School attracted 39 participants from around the world including 11 participants from Korea, China, Malaysia, Indonesia and South Africa funded by the Global CCS Institute.

The three-day School covered all aspects of CCS, including engineering, chemistry, geology, regulation and economics, with presentations from local and international experts. One of the strengths of the School is the interactions between participants from widely different backgrounds. The networks and friendships forged at the School will be an important part of advancing the future global CCS industry.

The School included field trips to the Latrobe Valley and to the highly successful CO2CRC Otway Project, Australia's only operational geological carbon storage project.



Participants at the 2011
CCS School

Conferences and Events ●●●●

Coal Gasification and Liquefaction Asia Summit 2011

Beijing China, 21-25 November 2011

» [Further information](#)

Carbon Capture and Storage

The Geological Society, London, UK, 22-23 November 2011

» [Further information](#)

ACI's Gasification 2011

London, UK, 23-24 November 2011

» [Further information](#)

COP17/CMP17 United Nations Climate Change Conference 2011

Durban, South Africa, 28 November to 9 December 2011

» [Further information](#)

World Clean Coal Week: China Focus 2011

Beijing, China, 6-9 December 2011

» [Further information](#)

Carbon Capture & Storage Forum

London, UK, 8 February 2012

» [Further information](#)

Coal-Gen Europe 2012

Warsaw, Poland, 14-16 February 2012

» [Further information](#)

European Carbon Capture and Storage conference

London, UK, 27-28 February 2012

» [Further information](#)

Third EAGE CO₂ Geological Storage Workshop

Edinburgh, Scotland, 26-27 March 2012

» [Further information](#)

CO₂ Futures is the newsletter of the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC).

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CO2CRC collaborates with leading international and national CCS experts to conduct world-class research into carbon capture and storage. Organisations participating in CO2CRC research include CSIRO, Geoscience Australia, the Universities of Adelaide, Curtin, Melbourne, Monash, NSW, Queensland and Western Australia, GNS Science (NZ), the Alberta Research Council of Canada and the US Lawrence Berkeley National Laboratory.

Industry and State core partners supporting CO2CRC are Anglo American, ANLEC R&D, BG Group, BHP Billiton, BP Australia, Brown Coal Innovation Australia, Chevron, Foundation for Research Science and Technology (NZ), INPEX, KIGAM, NSW Industry & Investment, QER, QLD Department of Mines and Energy, Rio Tinto, Sasol, Schlumberger, Shell, Solid Energy, Stanwell, Total, the Victorian Department of Primary Industries, WA Department of Mines and Petroleum and Xstrata.

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