

# COMMUNITY

## Newsletter



### HOT TOPICS

Four new members join CO2CRC

Otway Research Demonstrates Cheaper  
CO<sub>2</sub> Monitoring Costs

Examining the Costs of Carbon Capture  
and Storage for the Steel Industry



BUILDING A LOW EMISSIONS FUTURE

## MESSAGE FROM THE CEO

Dear Friends,

CO2CRC and the Otway National Research Facility continues to grow its reputation for outstanding scientific rigour internationally. I am pleased to announce that the University of Cambridge and Stanford University have joined CO2CRC as members. These prestigious institutions are working with CO2CRC and The University of Melbourne to interrogate data from our early research in new exciting ways.

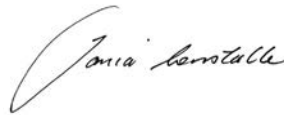
French oil and gas giant Total has also recently joined as a member as they seek to make the most of research that minimises their environmental impact, through their own activities and the products they sell. Closer to home, Woodside Energy became an industry member in the last quarter of 2017, meaning we now have close to 35 government, research and industry members.

**Utilising our scientific and engineering expertise, we are working with the steel industry to model the costs of applying CCS to a smelter in Australia; the analysis includes utilising CO2 for other value-added means.**

While CCS is regularly thought of in terms of reducing emissions in power generation, it is in energy intensive industry where CCS may eventually have the greatest benefits.

Speaking of benefits, the weather at the Otway National Research Facility was spectacular as we hosted more than 70 people for our Open Day. The day was a great celebration of the support that the community provides to CO2CRC and how we do our best to give back. The entire CO2CRC team is committed to ensuring we remain welcome in your community.

I am certain that 2018 will be a big year for CO2CRC, both at the site with our new storage research operations and through our global collaborations. We look forward to sharing this moment with you.



**Tania Constable**  
Chief Executive Officer



## OPEN DAY 2017

A fantastic sunny day greeted more than 70 visitors from the local community, Monash and Melbourne Universities, and the CSIRO, at CO2CRC's 2017 Otway National Research Facility Open Day. A team from CO2CRC, led by Chief Executive Officer Tania Constable, greeted visitors and answered the many questions posed about CCS and the details of the work being undertaken at the Otway Site.

Children were entertained by a giant slide and chocolate experiments designed to simulate the porosity and permeability of geological formations. Tours of the site's facilities were eagerly filled, and feedback included comments from locals that even though they had driven past the site frequently, they were unaware of the globally significant research going on in the paddocks.



Everyone that attended enjoyed the barbeque and barista coffee. We attribute this to the skills shown by the volunteer cooks from the Nullawarre Primary School and the locally sourced produce.

Over the next few months further upgrades to the visitor centre will be made to ensure we can accommodate more people outdoors with less exposure to the elements.

## TAIWANESE VISITORS TO SITE

In February we welcomed Taiwanese student, Polina Karimova, to the Otway National Research Facility. She is a Masters student in the Humanity and Environmental Science Program in National Dong Hwa University, Taiwan.

Polina developed an interest in CCS technology when she worked on her final class project titled Carbon Capture and Storage for Climate Change Mitigation.

Polina and her boyfriend, Vadim, were holidaying and visiting family in Melbourne when they called CO2CRC requesting a visit to the site. Community liaison officer, Shelly Murrell, was happy to give them a tour. Polina was excited to see the facility she'd heard about during her studies and is now planning a presentation on her visit for her Professor and classmates back in Taiwan.





## OTWAY RESEARCH DEMONSTRATES CHEAPER CO<sub>2</sub> MONITORING COSTS

Monitoring CO<sub>2</sub> permanently stored below ground is set to become more convenient, affordable and less invasive. Data from CO2CRC's storage program demonstrates that using permanently placed surface orbital vibroseis (SOVs) as a seismic source, provides data of comparable quality to that from traditional sources without the regular cost of vibroseis trucks and operators. With the ability to be controlled remotely, the SOVs obtain repeat data quickly and easily.

The small and low-impact SOVs, which have been designed, installed and operated by Lawrence Berkley National Laboratories (LBNL) have been used to monitor CO<sub>2</sub> injected into the subsurface. The information was compared with detailed data obtained

by Curtin University from a survey over the course of the injection of the 15,000 tonnes of CO<sub>2</sub>, using traditional means.

CO2CRC's 1km<sup>2</sup> array of 900 geophones buried at four meters, in conjunction with the SOVs, have pushed the boundaries of detection and observed a 5,000 tonne plume of carbon dioxide. Being able to detect 5,000 tonnes of CO<sub>2</sub> provides confidence to regulators that even environmentally insignificant volumes of CO<sub>2</sub> can be accounted for. The results also provide assurance that the stored carbon dioxide has moved and settled as modelling predicted.

CO2CRC and LBNL intend to install several more SOVs at its Otway National Research Facility this year as part of its Stage 3 Storage Project. The SOVs will be used in conjunction with fibre based seismic receivers in up to four new wells to further assess the possibilities of this variety of seismic source.



Surface orbital vibroseis (SOVs) installed and operated by Lawrence Berkley National Laboratories (LBNL)

## GREATER VERSATILITY FOR OTWAY VISITOR CENTRE AS IT REACHES 500 VISITORS PER YEAR

Work is nearing completion at CO2CRC's National Otway Research Facility Visitor Centre to create a new eye catching covered external work and visitor area.

"The existing Visitor's Centre on Brumby's Lane, Nirranda South has served the research facility well for over 10 years, but with more than 500 visitors coming to tour or work at the facility, the building's external limited work space was becoming more of an issue." CO2CRC Chief Executive Officer Tania Constable said, "Space in the centre has been pretty tight with visitors often needing to share space with working scientists, so we decided it was time to do a major renovation."

CO2CRC has been fortunate to attract funding from the Global Carbon Capture and Storage Institute (GCCSI) for its visitor facilities, education and site maintenance, and have used some of this to enhance visitor experience by making the centre more distinctive by providing additional weather protection to our deck area. Until now, full use of the deck has been hampered by the often windy and wet weather at Nirranda South.

The work will complement an upgrade to the parking and garden area, using native plants, undertaken by local Allansford Garden Designer Paul Ryan. The building work is being undertaken by NK and CM Dance and was designed by local architect Neil Holland.

Work is expected to be completed during March.

## EXAMINING THE COSTS OF CARBON CAPTURE AND STORAGE FOR THE STEEL INDUSTRY

The iron and steel industry is one of the biggest industrial emitters of CO<sub>2</sub> globally. It is estimated that between four and seven percent of human originated CO<sub>2</sub> emissions come from the steel industry in Europe. In China, the iron and steel industry accounts for 10 percent of total domestic CO<sub>2</sub> emissions, and ranked as the third largest industrial CO<sub>2</sub> emitter after the power generation and cement sectors. In Australia, annual steel production contributes more than 30 percent of total industrial emissions excluding power and energy.

To reduce global emissions, we need to look beyond power generation, oil and gas, and also examine how industrial sectors contribute to emissions and how they can be reduced. For Australia and others to meet the agreed target of 2°C or less, CCS needs to be comprehensively adopted as an emissions reduction technology on industrial applications.

CO2CRC is working with the iron and steel industry in Australia to reduce their CO<sub>2</sub> emissions. In an integrated steel plant, about 73 percent of emissions

are due to combustion and 15 percent due to process emissions. CO2CRC is conducting feasibility studies on an iron and steel works in Australia to see how CCS can be applied. This work includes:

- Exploring the option of converting the LDG (Basic Oxygen Steelmaking off gas, commonly known as Linz Donawitz Gas or LDG) to a high-quality value-added product.
- Evaluating all major CO<sub>2</sub> emissions sources and propose CO<sub>2</sub> capture options and technologies, including alternative options (preferably Australian based technology) for converting the CO<sub>2</sub> to a high value product.
- Investigating and summarising the emissions reduction strategies applied in steelworks worldwide and assessing the applicability to the Australian context.
- Gathering information on CO<sub>2</sub> storage options that are suitable considering the location of the facility.
- This work will be undertaken through 2018 and will be not only valuable to the Australian steel industry, but may also have applications to other steel manufacturers.

## FOUR NEW MEMBERS JOIN CO2CRC

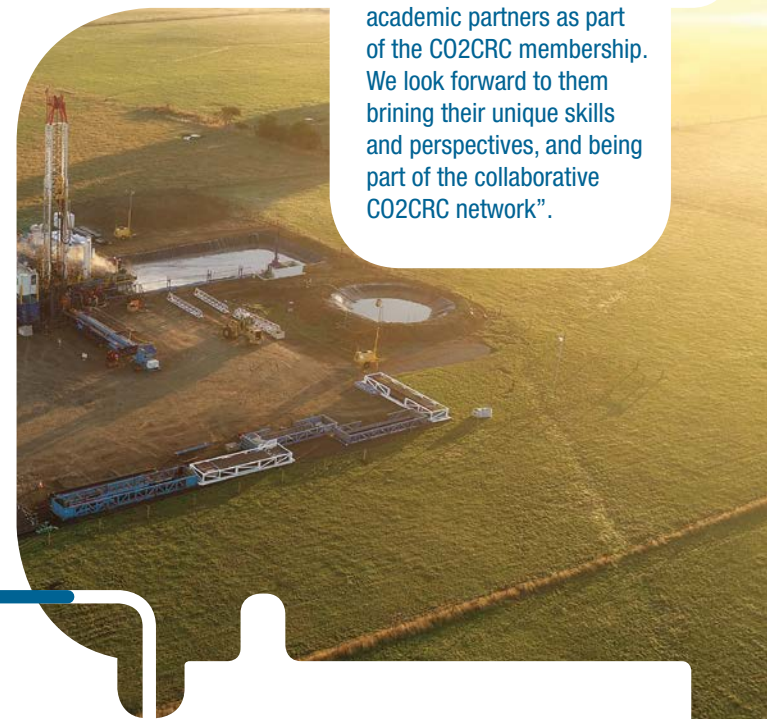
Prestigious Cambridge and Stanford Universities have recently joined CO2CRC as research partners, in an agreement that includes The University of Melbourne in data sharing. Stanford and Cambridge represent some of the best CCS knowledge in the United States and United Kingdom respectively and they have been attracted to working with CO2CRC because of the quality field-based research data acquired from the Otway National Research Facility.

The collaborative project will test new methods of CO<sub>2</sub> storage at the Otway National Research Facility, as well as look to improve existing ones.

By applying theoretical modelling and undertaking small-, medium- and large-scale experiments, the researchers hope to significantly increase the types of sites where CO<sub>2</sub> storage is possible, including in China and developing economies.

With extensive oil and gas operations in Australia and globally, both Total and Woodside are looking to CCS to assist in curbing their own emissions and in the products they produce. Bringing the strong industrial focus of tangible, cost-effective and readily applied solutions to CCS Total and Woodside enhance the already extensive industry representation within the organisation.

Tania Constable CO2CRC CEO said, "We are delighted to have two new respected industry and two prestigious academic partners as part of the CO2CRC membership. We look forward to them bringing their unique skills and perspectives, and being part of the collaborative CO2CRC network".



## NEW STAFF JOIN CO2CRC AS WE EXPAND OPERATIONS

**Ms Jane Visser – Community Liaison**

Jane Visser has joined CO2CRC in Gippsland in a newly created role in communications and stakeholder engagement for number of projects that will further establish the understanding of ocean, subsurface, seismic and atmospheric activities in the Latrobe Valley through the use of robust technologies. The GIPNET project as it is known, feeds knowledge into the proposed CarbonNet CO<sub>2</sub> storage project undertaken by the Victorian and Commonwealth governments. Importantly for CCS research, some of the innovative technologies will have applications in CCS sites globally.

Jane brings more than decade experience in the sector. She has worked for Cities for Climate Protection, National Greenhouse and Energy Reporting and resource efficiency projects.

Jane has worked in both the public and private sectors in areas such as community engagement, conservation and environmental management and held positions in communications as the Officer for the Commissioner of Environmental Sustainability and Environment Officer at Moira Shire Council.

**Dr Mohammad Bagheri – Engineering/Operations**

In the Melbourne office, Dr Mohammad Bagheri has joined CO2CRC as our lead petroleum reservoir engineer. Mohammed has a wealth of experience in the oil and gas sector, having spent 14 years working on projects in the North Sea and more recently in Santos South Australia. Mohammad's experience has been in reservoir characterisation, reserve estimation, reservoir simulation, production engineering, production optimisation, field development planning, water flooding, CO<sub>2</sub> injection, field operations and horizontal drilling in the Middle East (North Sea Assets) and Australia.

Mohammad will be working with the CO<sub>2</sub> Storage team on the Stage 3 project.



Building the roof over the deck



Side view of the construction





## ONLINE CCS COURSE – FREE TO ALL

The University of Edinburgh is offering a free course in CCS. Luckily you will not have to brave the cold Edinburgh weather to take part, as the course will be online! The course is aimed at a very broad audience and any of the more technical details will be explained at a high school level.

The course will begin on 15 March and will run for five weeks. The following topics will be covered:

**Week 1** – Why we need Carbon Capture and Storage: Climate drivers

**Week 2** – The role of CCS in key sectors of the economy

**Week 3** – Carbon Dioxide Capture technologies

**Week 4** – Geological storage of carbon dioxide

**Week 5** – Future prospects

The course is free and all you need to do is register your interest at the following website:  
<https://www.edx.org/course/climate-change-carbon-capture-storage-edinburghx-ccsx>




## CO2CRC COMMUNITY REFERENCE GROUP MEETING

**Wednesday, 4 March 2018  
12 noon**

Visitor Information Centre  
CO2CRC Otway National Research Facility  
Brumby's Lane Nirranda South

A Light Lunch will be provided.


Please RSVP to Shelly Murrell on


 0458 462 063


 [Shelly.Murrell@co2crc.com.au](mailto:Shelly.Murrell@co2crc.com.au)


### CO2CRC Limited

11 – 15 Argyle Place South  
Carlton VIC 3053 Australia

 +61 3 8595 9600

 [info@co2crc.com.au](mailto:info@co2crc.com.au)

 [www.co2crc.com.au](http://www.co2crc.com.au)

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