

# Social issues in CCS: Working with the community



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China Australia Geological Storage of CO<sub>2</sub>

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# The Cooperative Research Centre for Greenhouse Gas Technologies - CO2CRC

- An R&D collaboration between research, industry and government
- Funding from Federal and State Governments and industry partners, in-kind support from research organisation partners
- Active in CCS research since 2003
- Research along the full chain of CCS, from capture to storage, including economics, risk assessment, communication, education and training
- CO2CRC recently awarded \$51.6m from the Federal Government. New project – CCSNET.



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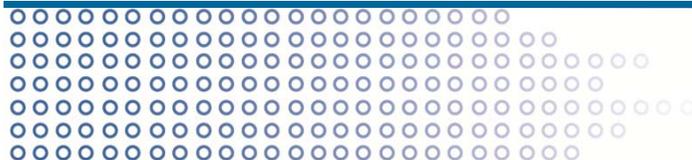
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# CO2CRC Participants



**Supporting Partners:** The Global CCS Institute | The University of Queensland | Process Group | Lawrence Berkeley National Laboratory  
 CANSYD Australia | Government of South Australia | Charles Darwin University | Simon Fraser University



# What environmental issues related to CCS affect communities?

- Climate change will affect communities
- Taking action to avoid climate change should not create more problems than we are trying to solve
- Communities need access to energy – and reducing emissions means using new technology – including CCS



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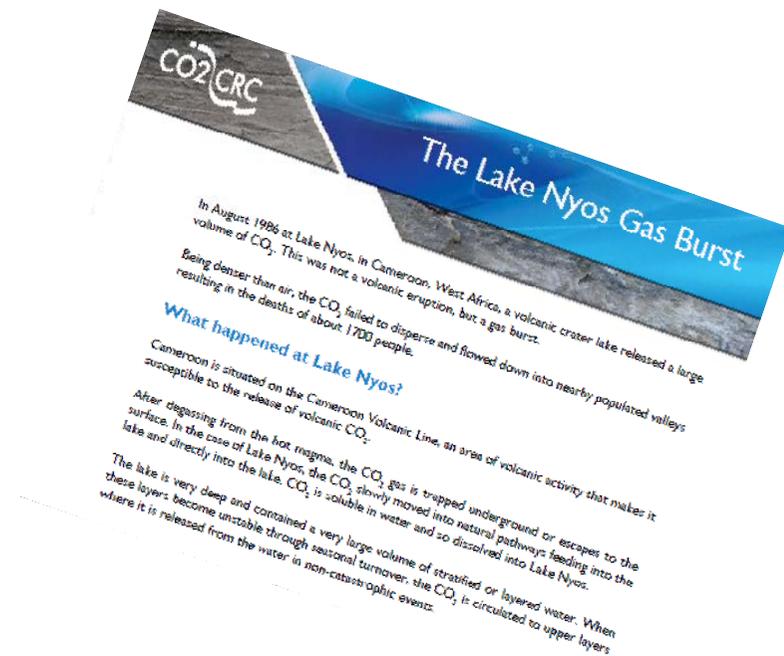
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# The importance of community in CCS

- Communities need to know that new technology is safe



- CCS projects need access to land and resources – community involvement is vital

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# Questions about CCS

- Is it safe?
- Will it affect groundwater?
- What will happen if there is a leak?
- Will my land/crops/livestock/house be affected?
- Will I get compensation?
- Will my electricity bill go up?
- Will jobs be created?
- Will I get royalty payments?



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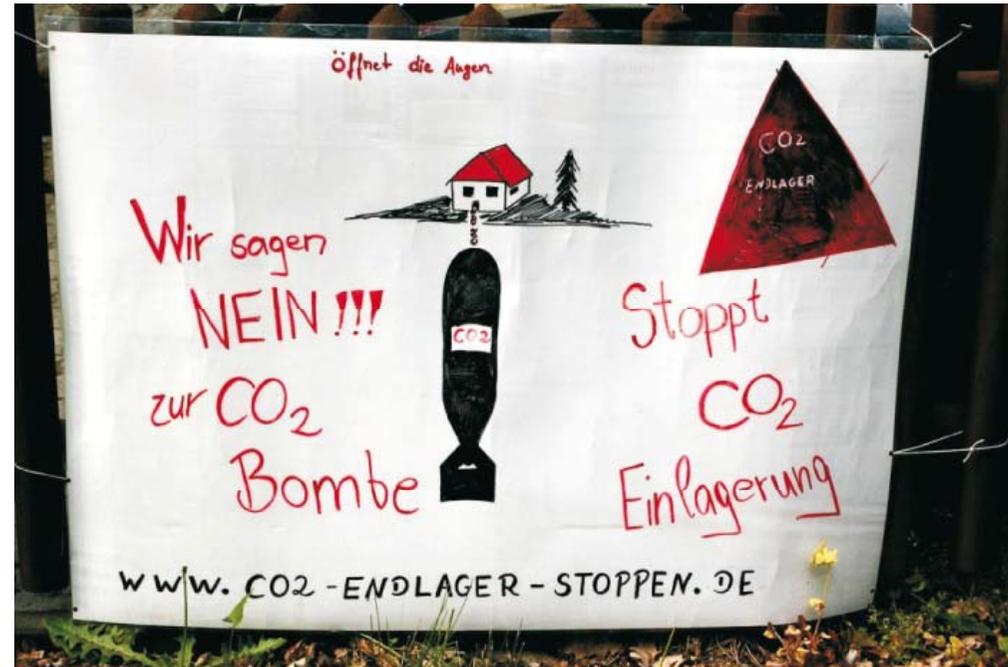


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# Some community reactions to CCS

- Barendrecht, The Netherlands
- Weyburn, Canada
- Mattoon, USA
- Wallula, USA



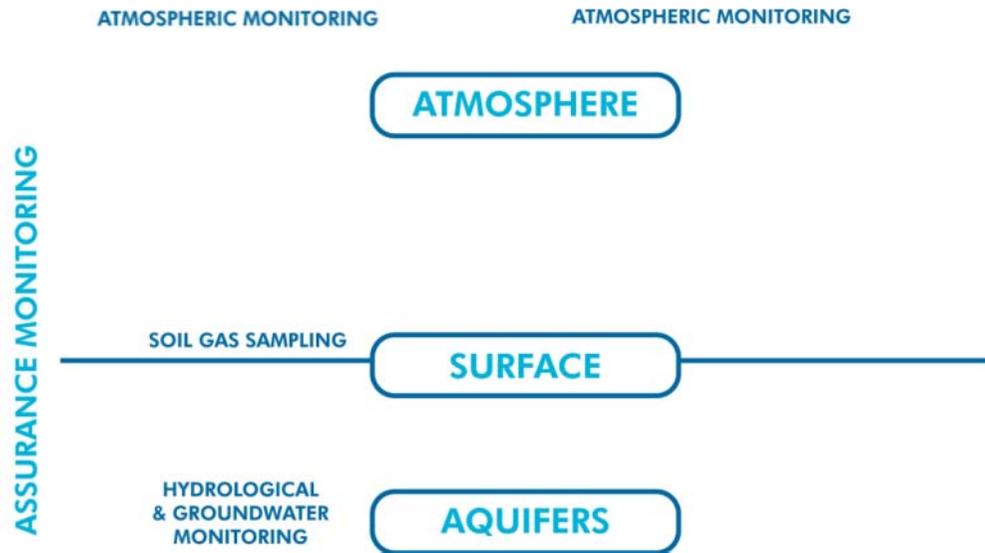
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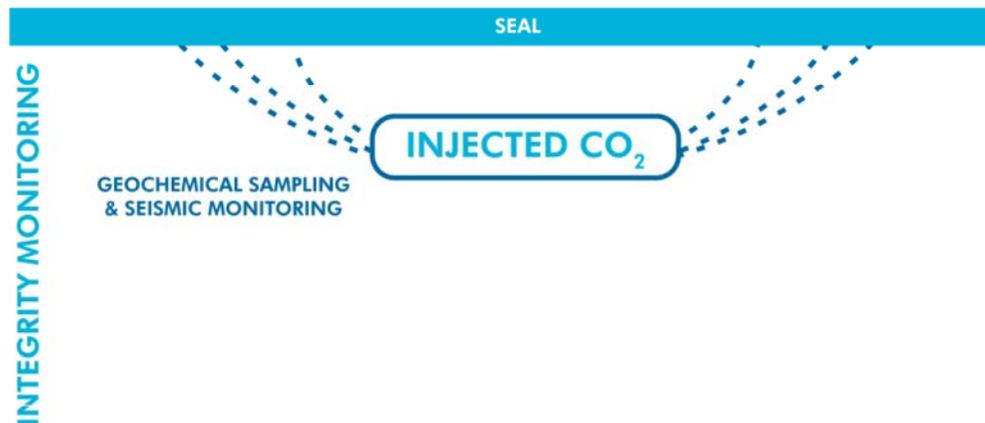
# Assuring the community – a monitoring plan



Measuring the atmospheric concentration of CO<sub>2</sub>

Measuring the concentration of CO<sub>2</sub> in the soil

Analysing the groundwater



Measuring the temperature and pressure, recording sound waves and detecting chemical changes



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# The monitoring plan:



Soil gas sampling



Groundwater sampling



Atmospheric sampling



Downhole fluid sampling



Seismic Surveys

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# Atmospheric monitoring



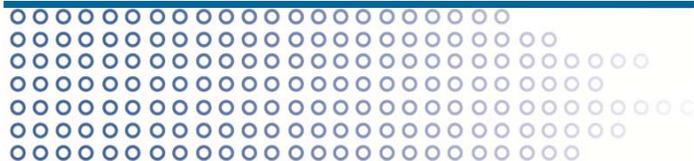
Atmospheric module



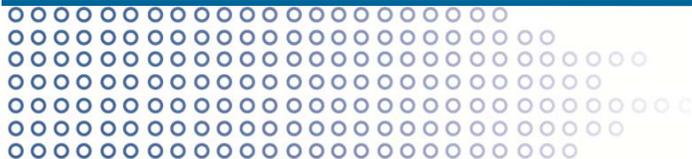
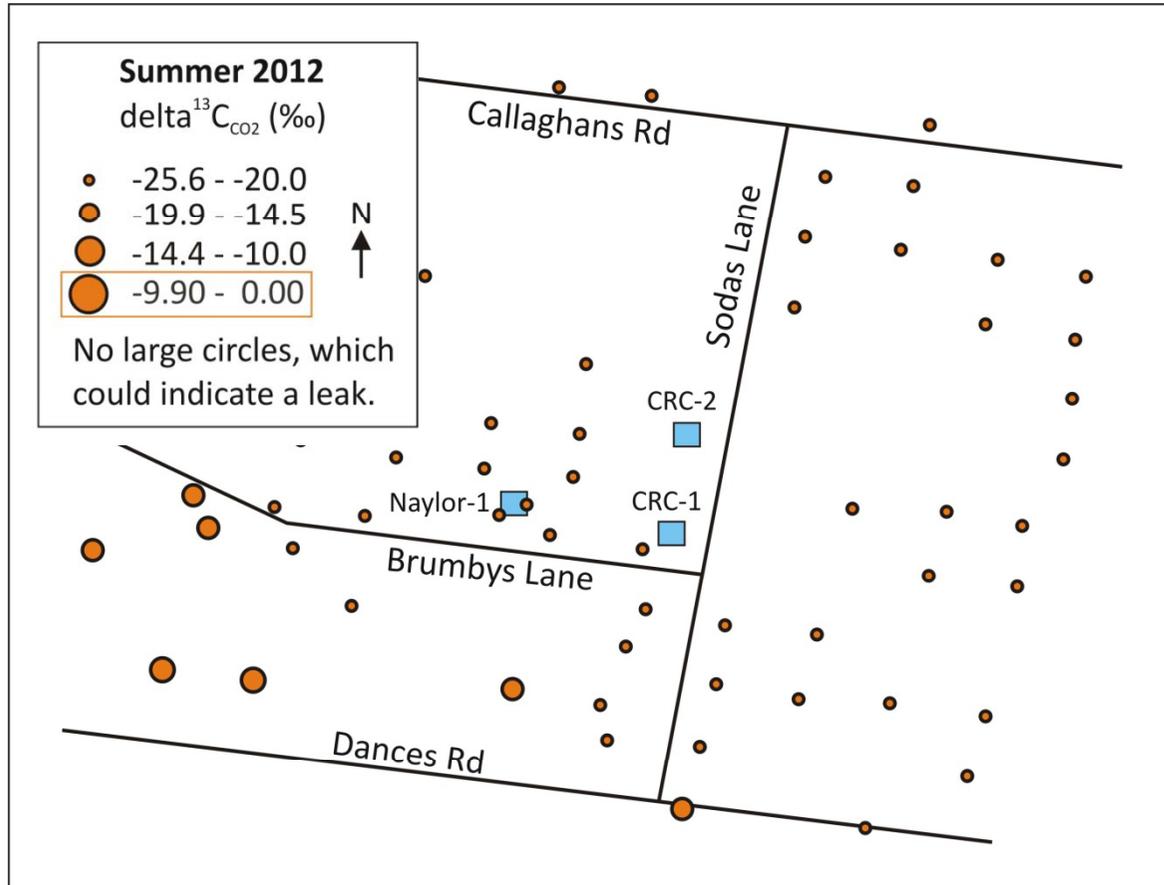
Flux station

- Monitoring began late 2006
- Existing CO<sub>2</sub> sources characterised
- No evidence of emissions from CO<sub>2</sub> storage - able to detect an increase in anthropogenic CO<sub>2</sub> of only 3 ppm despite large scale diurnal and seasonal fluctuations.

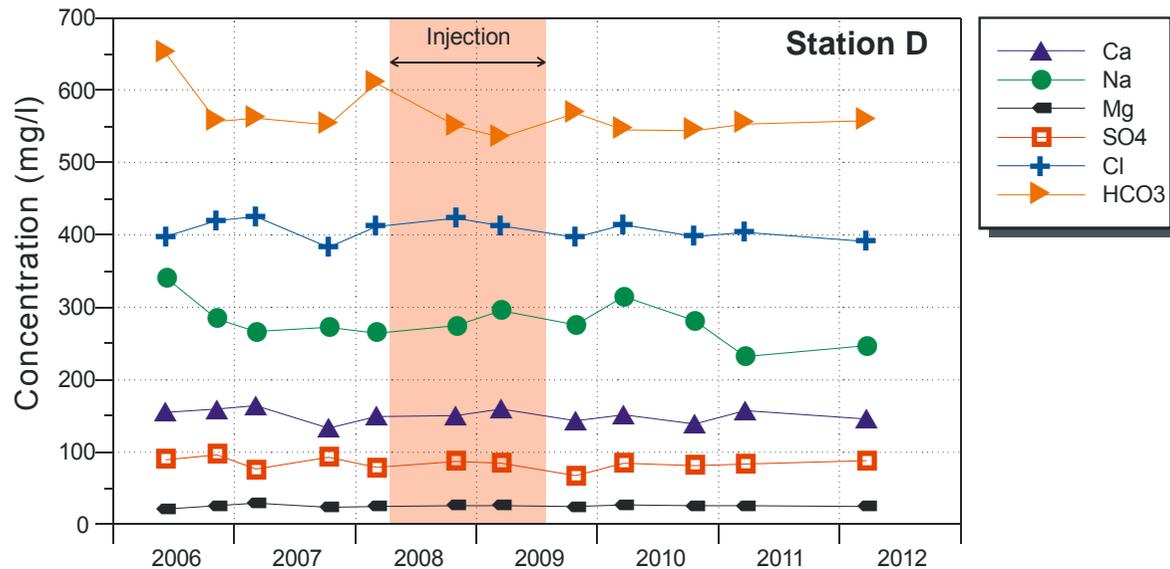
D. Etheridge et al.,  
CSIRO



# Soil gas monitoring



# Groundwater monitoring



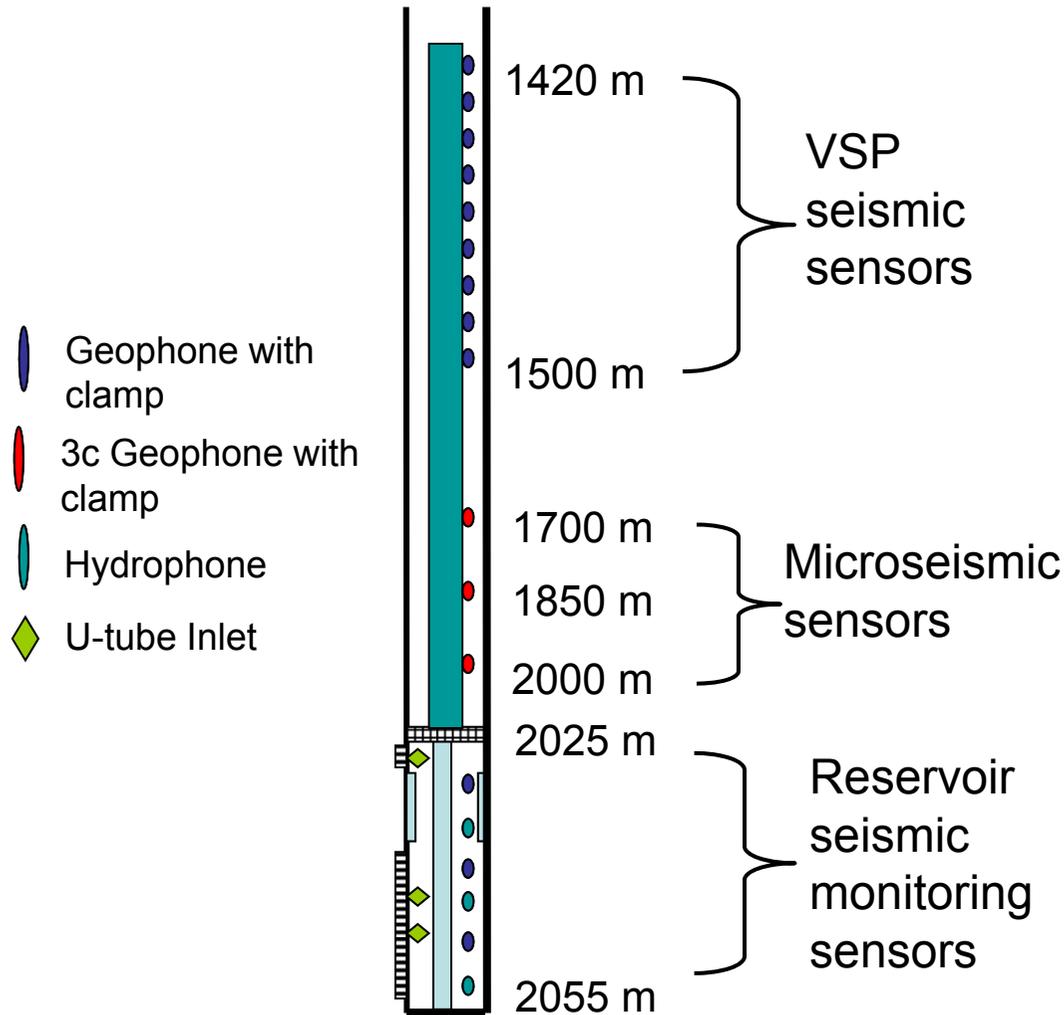
- Baseline groundwater levels and chemistry established for both Port Campbell and Dilwyn freshwater aquifers
- Sampled before, during and after injection (March 2008 - Aug 2009)



- Approximately 25 wells within 10 km of CRC-1
- Samples analysed for pH, redox (Eh), electrical conductivity (EC), temperature, alkalinity, isotopes ( $\delta^2\text{H}$ ,  $\delta^{13}\text{C}$ ,  $\delta^{18}\text{O}$ ,  $\delta^{34}\text{S}$ ), major anions & cations, suite of trace elements.

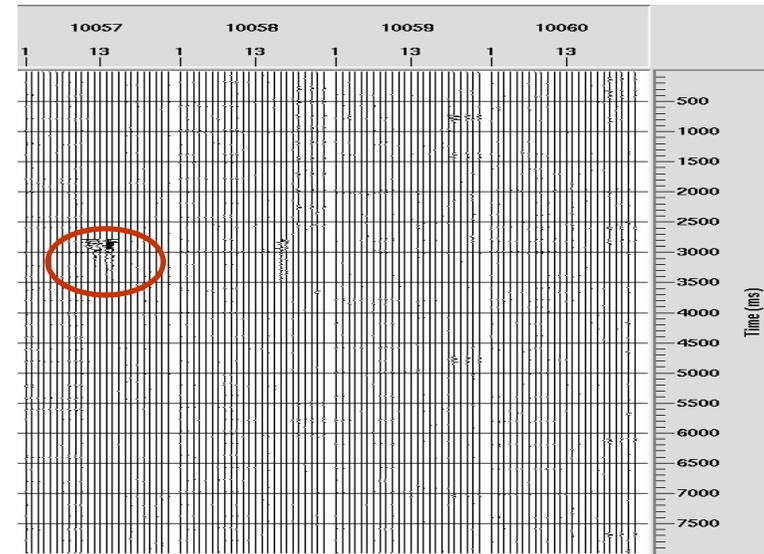


# Naylor-1 Monitoring: 24-Channel Seismic



## Microseismic results:

- Few events, all insignificant
- Continuous recording for 1 month during injection
- Triggered recording post-injection



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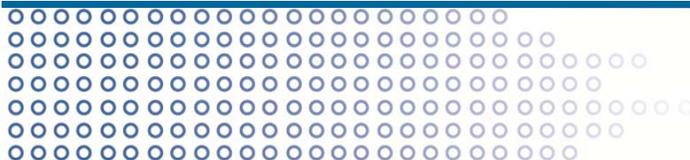
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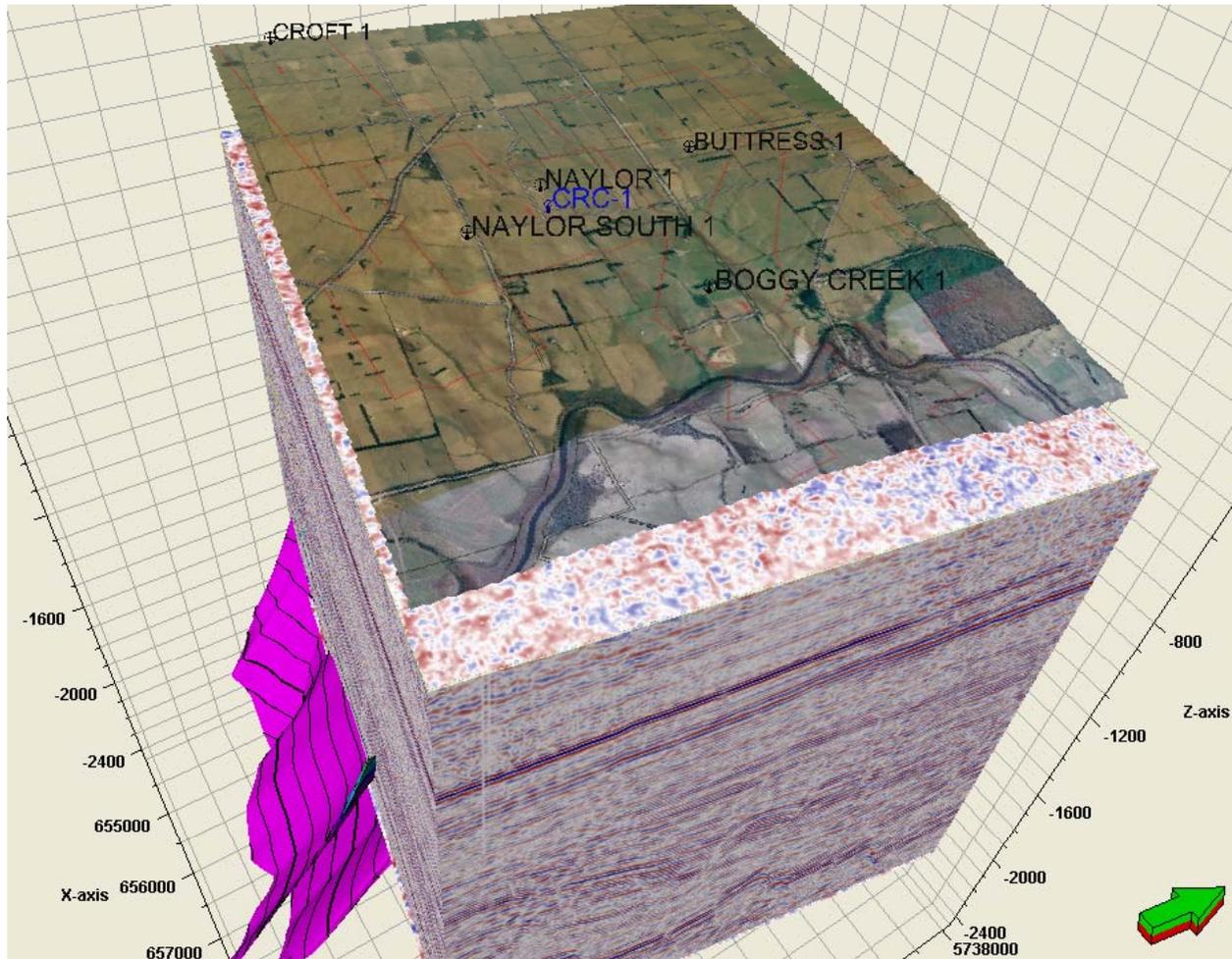
# Seismic monitoring



- Range of seismic techniques
- Vertical Seismic Profiling (VSP) (source surface, receiver downhole)
- High Resolution Travel time
- Microseismic surveys (measures creaks in the subsurface)



# 3D and 4D seismic monitoring



T. Dance, CSIRO

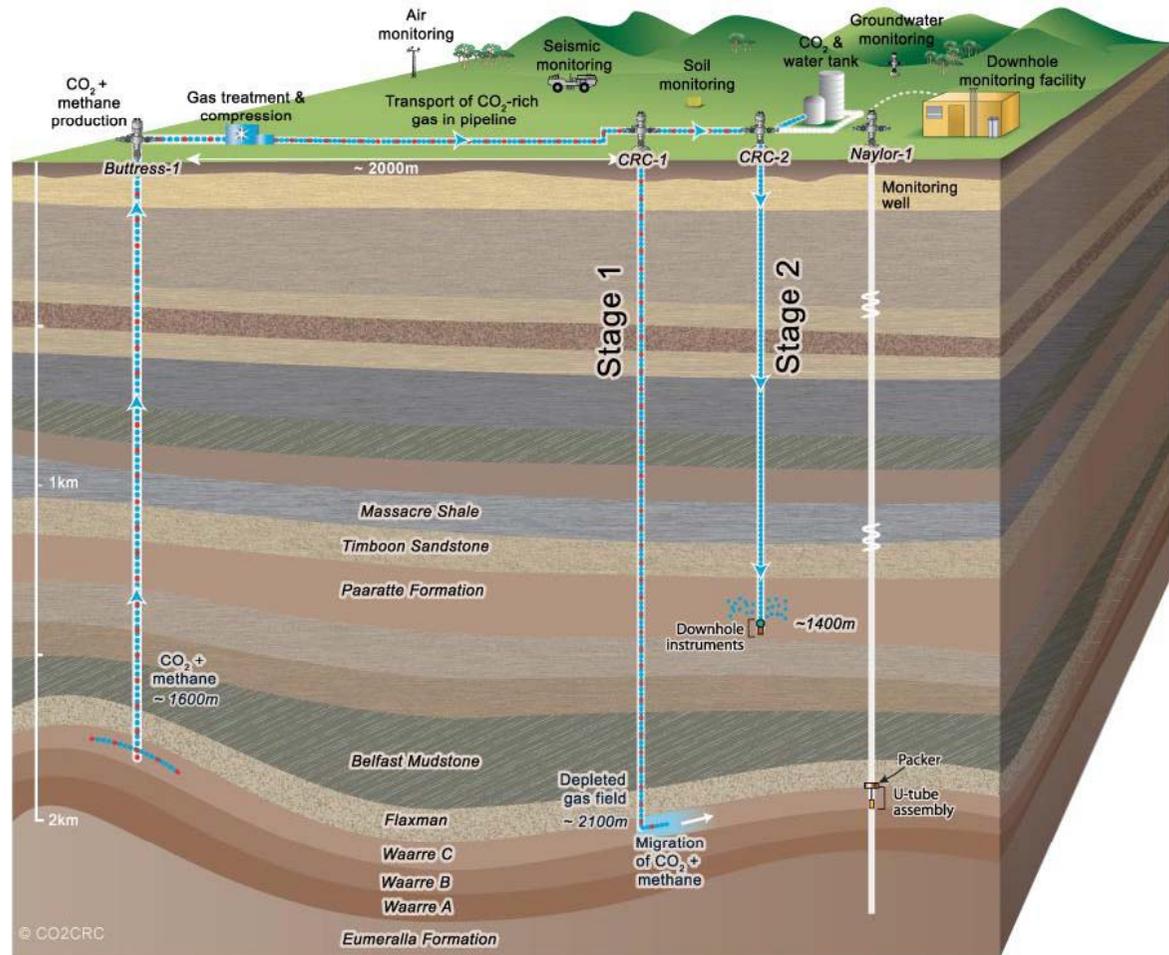
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# The CO2CRC Otway Project

- Project began injection in April 2008
- 65,000 tonnes of CO<sub>2</sub>-rich gas injected to date in Stage 1
- Stage 2 well drilled in 2010
- Stage 2 experiment underway



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# CO2CRC Otway Project - Stage 2

## *What have we done*

- Investigated CO<sub>2</sub> storage in saline formations
- Tested for residual trapping of CO<sub>2</sub> (residual gas saturation test)
- Refining the suite of scientific methods and monitoring techniques used at the Otway Project
- Ongoing community engagement



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# CO2CRC Otway Project - Stage 2C

## *What are we doing?*

- Detect injected Buttress gas in the subsurface; ascertain minimum seismic detection limit
- Observe the gas plume development using time lapse seismic
- Verify stabilisation of the plume in the saline formation using time lapse seismic.



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- The Otway Subsurface Laboratory (OSL) \$19M
- The Gippsland Monitoring Network (GipNet) \$7M
- The Australian CCS Research Laboratories Network (CCS LabNet) \$25M

# CCSNET



# Begin early in the project

- Planning for consultation began early in the project. Communications plan drawn up by CO2CRC's project team.
- Early stages of the plan included
  - Preliminary meetings with landowners
  - Survey of residents in the community



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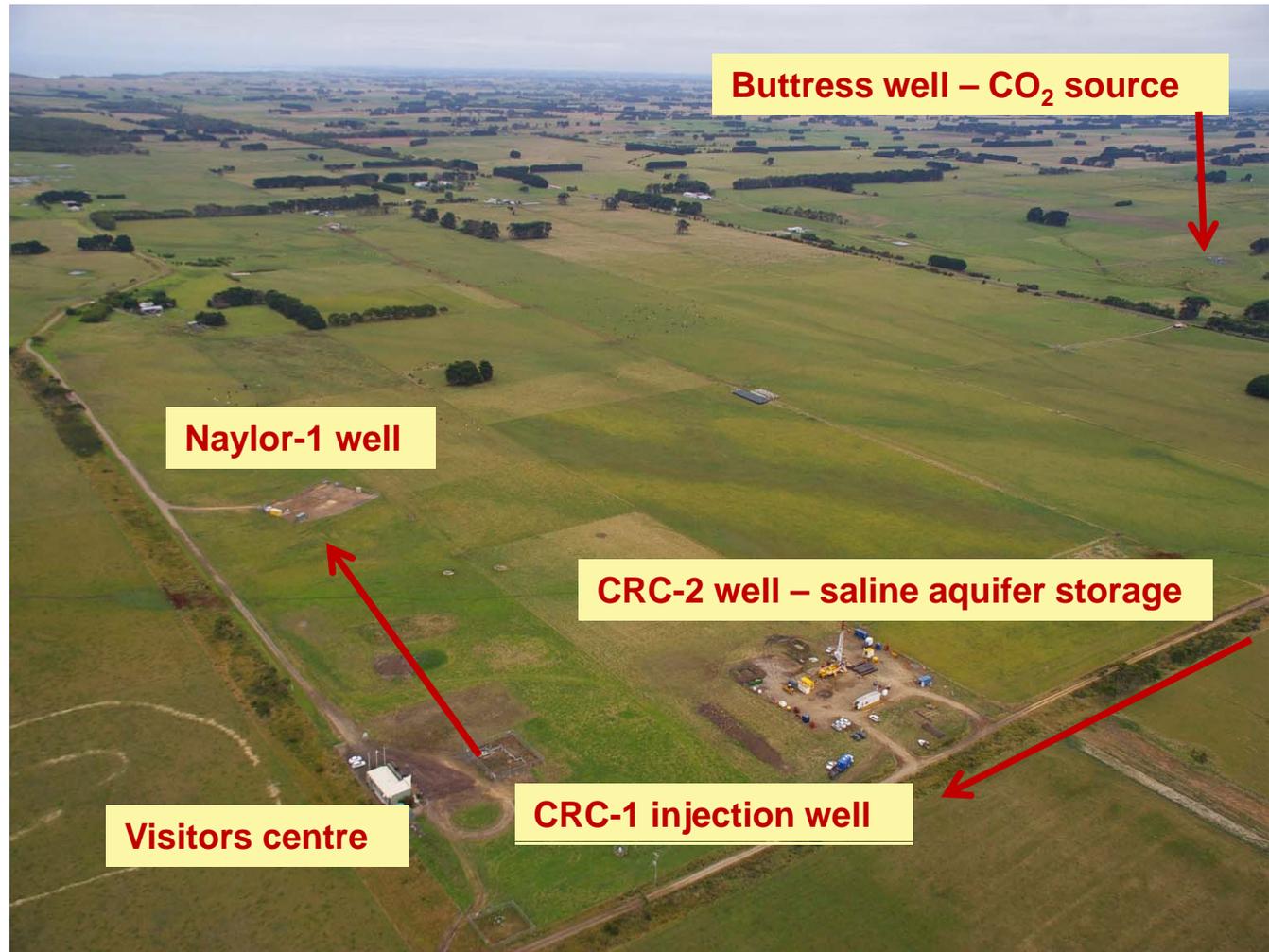


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# Understand the community.

- The project is located in a dairy farming community
- The production well is located on a different dairy farm to the injection and monitoring wells.



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# Community groups involved in the project

- The production and injection wells are located on dairy farms
- In 2004 preliminary meetings were held with the landowners and the local government
- Other groups identified were the local media, local environmental groups, local businesses and the general community
- A community reference group was established: including landowners, regulators, local NGOs and project management



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# Working with the community

- Meetings
  - In 2006 and 2007 community consultation meetings were held
  - Participants included landholders, local businesses, environmental groups, government officials, the local media and the general community
  - Community reference group meetings ongoing –most recent meeting was 18<sup>th</sup> September 2013.
- Other communication
  - Community newsletters
  - Local newspaper articles
  - Fact sheets
  - Website
  - Video
- Facilities
  - Visitors' centre



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# Social research

- Social research was carried out in 2006 and 2011.
- This research was in two parts
  - Quantitative survey - questionnaires
  - Qualitative survey – focus groups



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# 2006 Social Research

**Quantitative:** Community Perceptions Survey – local and regional (302 respondents – 150km radius).

**Qualitative:** Focus groups and in-depth interviews.

- Addressing climate change was an important issue (93%).
- Little awareness of CCS, but supportive of new approaches.
- Safety and leakage of CO<sub>2</sub> were the main concerns (71%).
- Local residents preferred a personal approach and wanted to be informed before the wider public and the media.
- Information about the project should be available but not pushed – respondents felt ‘over-consulted’.
- Respondents believed it was important for project information to be clear, concise and factual – not ‘spin’.



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# Preparing communications messages and materials

- The communications plan was developed
  - Meetings were planned
  - Fact sheets were prepared
  - Community newsletter was prepared
  - Plans for a major launch were developed
  - A community liaison officer was appointed

## Media Release

2 April, 2008.



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# 2011 Social Research

- Evaluate changes over time in perceptions of the Otway Project
- Evaluate changes over time in attitudes to CCS
- Assess the effectiveness of communication channels and the project consultation program



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# 2011 Social Research

- Similar approach to 2006 – qualitative and quantitative. Asked the same questions where possible.
- Focus on local community
- Survey of regional centre for comparison



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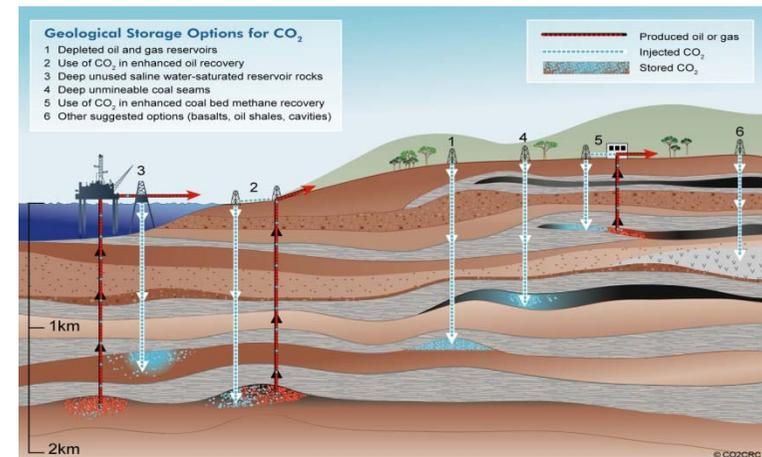


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# Have attitudes to CCS Changed?

- Awareness of CCS has more than doubled since 2006.
- CCS is still seen as the least important option for reducing emissions, although trialing the technology was seen as important.
- No strong negativity towards the technology.
- Gap between what CCS is and what people 'know' CCS to be.



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# How is the Otway Project perceived?

- Awareness of the Otway Project has more than tripled since 2006.
- Outreach to landowners was effective in strengthening the relationship with CO2CRC.
- Liaison officer is appreciated and vital to positive relationships with the Project – but need the right person for the job.
- Wider community much more aware of the Project and comfortable with it, although it was not regarded as having a high profile.
- The concerns about the Project have not changed, centred mainly around safety.



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# How effective was our communication?

- Informal measurement
  - Feedback from landowners
  - Monitoring the local media
  - Talking with community groups
- Formal measurement
  - Social survey run alongside Stage 2.



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# A long-term communication plan

- Liaison officer - local resident
- Tours for community, industry, government, researchers and students
- Ongoing community reference group meetings
- Community newsletter
- Annual Open Day



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# Public awareness

Social research has shown that:

- Most people do not know about CCS;
- CCS should be talked about when climate change is discussed;
- Information about CCS should come from a variety of trusted sources - industry, governments, community leaders and NGOs.
- We need to educate leaders in these groups about CCS



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# Lessons learnt



- Start early.
- Do the research
  - Know the community
  - Know the influencers
  - Know the channels
- Develop a strategy.
- Consult widely – individuals, community groups, local government.

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# Lessons learnt

Make sufficient resources available:

- Funding for social research
- Time and personnel for meetings and planning
- Communications materials – fact sheets, website, video



## Injecting CO<sub>2</sub>



Drilling the well



Casing the hole



Injecting CO<sub>2</sub>



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# Lessons learnt

- Be credible
  - Engage in two-way communication
  - Be open and transparent
  - Involve the researchers



Josie McInerney and Roy Anderson set up the Open Day signs



- Show the technology in action – visits, tours, Open Days
- Get into the community – be visible

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# Lessons learnt

- Direct communications like newsletters are good – but keep them simple
- Different channels are important in different communities – local paper may be better than national papers



- Use local media wherever possible
- Evaluate and refine the communications plan continually
- Follow up research – can be expensive but very useful

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# Community consultation

World Resources Institute recommends:

- Understand the local community
- Exchange information about the project
- Work out who should be involved in the consultation
- Discuss risks and benefits of the project
- Resolve community grievances through dialogue; and
- Continue the engagement through time



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# Resources for community consultation

Recently, many groups from research, industry, government and NGOs have developed resources to communicate CCS:

- CSIRO – Social Characterisation: From Concept to Application  
<http://www.globalccsinstitute.com/publications/social-site-characterisation-concept-application>
- NETL – Best Practices for Public Outreach and Education for Carbon Storage Projects  
[http://www.netl.doe.gov/technologies/carbon\\_seq/refshelf/BPM\\_PublicOutreach.pdf](http://www.netl.doe.gov/technologies/carbon_seq/refshelf/BPM_PublicOutreach.pdf)
- ANLEC R&D – Critical issues for CCS communication & outreach activities in Australia  
<http://www.anlecrd.com.au/publications>
- Bellona – Guidelines for public consultation and participation in CCS projects  
[http://www.bellona.org/filearchive/fil\\_Guidelines\\_public\\_support\\_for\\_CCS\\_Bellona.pdf](http://www.bellona.org/filearchive/fil_Guidelines_public_support_for_CCS_Bellona.pdf)



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# The CO2CRC communications team

- Tony Steeper
- Josie McInerny
- Matthew Harris
- Roy Anderson

Thanks to our talented researchers for their input.



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# 谢谢

## Thank you



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