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# Public Perceptions to Energy Technologies in Australia!

Presentation to Australia-Japan Coal Technology Workshop  
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## Outline for today

- What is CSIRO
- Rationale for social research
- Large group process
- Perceptions to coal and CCS
- Conclusions



Today I am going to tell you a little about CSIRO, my research team and also about the range of international research partners we have working in the area of public perceptions to climate change and energy.

Then I will describe our rationale for social research and some of the research processes that we use.

Then I will present some of the results of our research that we have conducted over time, particularly focussing on public perceptions to CCS and then will present some conclusions that we have drawn as a result of our research.

## Commonwealth Scientific and Industrial Research Organisation (CSIRO)

- Leading science and technology research organisation
- Over 56 different sites, 6000 employees
- Matrix organisation – Flagships/Divisions



CSIRO Social Research at Exploration and Mining












CSIRO stands for Commonwealth Scientific and Industrial Research Organisation it is the leading science and technology research organisation in Australia. Just over 80 years old and probably one of the most trusted institutions in Australia.

Currently operates over 56 different sites and employs approximately 6000 people.

It operates as a matrix organisation comprised of 9 flagships and 19 divisions.

This is a picture of the Energy Transformed Flagship Site in Newcastle.

# CSIRO Flagship Program

 <p><b>Energy Transformed Flagship</b> Developing clean, affordable energy and transport technologies for a sustainable future.</p>	 <p><b>Preventative Health Flagship</b> Improving the health of Australians through disease prevention and early detection.</p>
 <p><b>Food Futures Flagship</b> Transforming the agrifood sector through frontier technologies and partnering.</p>	 <p><b>Water for a Healthy Country Flagship</b> Addressing the sustainable management of Australia's water resources.</p>
 <p><b>Light Metals Flagship</b> Developing new ways to produce light metals, to reduce costs and energy use and improve performance.</p>	 <p><b>Wealth from Oceans Flagship</b> Focusing on delivering ocean-based economic, social and environmental wealth to the nation.</p>
 <p><b>Climate Adaptation Flagship</b> Finding ways to adapt to the impacts of climate change and variability.</p>	 <p><b>Minerals Down Under Flagship</b> Coordinating minerals research to ensure the competitiveness of Australia's resource base.</p>
 <p><b>Future Manufacturing Flagship</b> Using nanotechnology to create a new wave of industries and add value to existing manufacturing.</p>	

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Flagships are established around areas of national significance and drive much of the research across CSIRO divisions. I am going to focus predominantly on the Energy Transformed Flagship which has funded most of our work. Which has a goal to halve greenhouse gas emissions and double the efficiency of the nation's new energy generation, supply and end use, and to position Australia for a future hydrogen economy.

## Our social research at CSIRO

- **Energy Transformed Flagship's Goal:**
  - We are focusing on research to halve greenhouse gas emissions and double the efficiency of Australia's new energy generation technologies.
- **Bring together range of theoretical and social research processes to engage with communities effectively**
  - Large surveys – baseline understanding
  - Small facilitated workshops
  - Citizens panels
  - Desktop reviews etc.
  - Case studies
  - Communities self selecting
- **Understanding social risk to greenhouse gas emissions reduction**
- **Understanding effects of information in bringing about behaviour change to our achieve mitigation goal**

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As I stated before the Energy Transformed Flagship has a goal..... As per slide words above

## Why bother? The value of social research

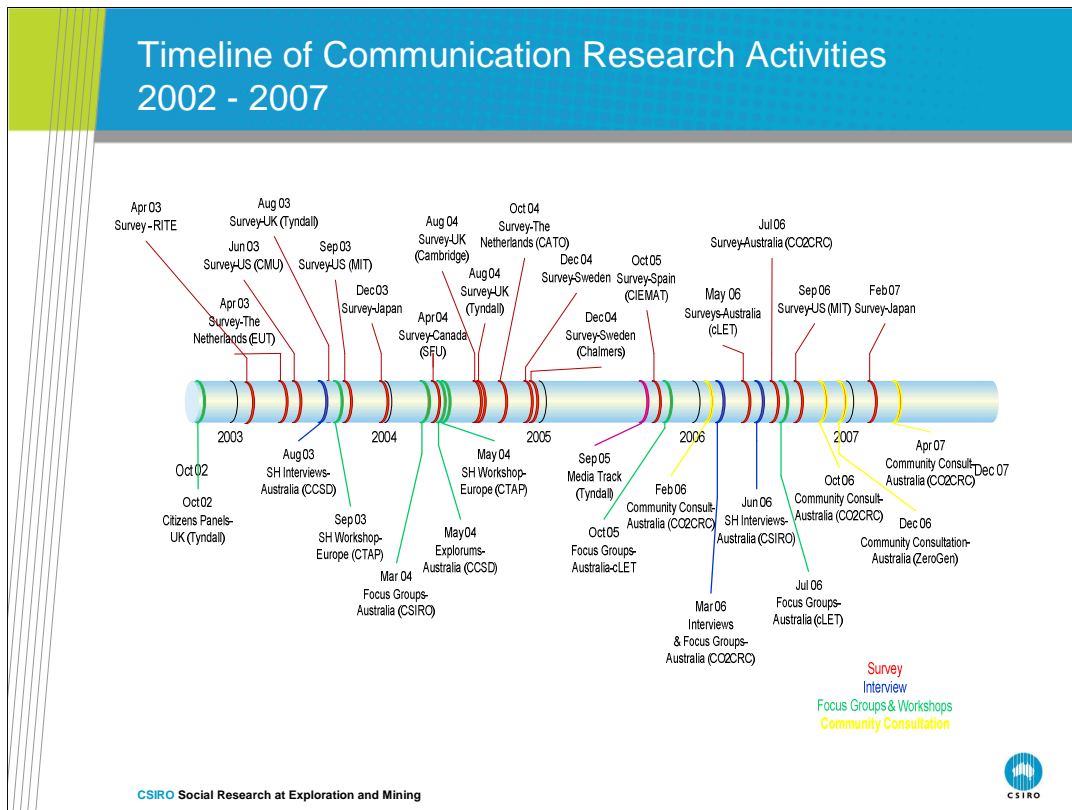
- **A major risk to technology adoption if there is no appropriate engagement with stakeholders during the development process.**
- **Public attitudes to new technologies can change over time however, once formed they can be slow to change**
- **Social research can**
  - enhance technology outcomes through a better knowledge of the end user environment
  - identify societal issues and suggest strategies for addressing them
  - increase the awareness of new technology development
- **Is a means of managing social risk as well as increasing profile and delivering better research outcomes.**



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As per slide



In 2006 set up an international social research group. Just recently been taken in as part of the IEA GHG research networks and are now called IEA GHG Social Research Network. Over 70 researchers from range of institutions across the world. This slides shows there has been a range of research into public perceptions and CCS over the past few years. Now a little out of date but gives you an indication of the breadth of work that has been going on. Predominantly survey with some qualitative components. And some direct engagement where demonstration projects have been proposed. For example, Otway Basin, Zerogen etc.

**INCLUDES National Institute of Advanced Industrial Science and Technology (AIST) – Makoto Akai & Mizuho Information and Research Institute Kenshi Itaoka from Japan.**

## Qualitative approach – large group process

Time	Saturday
8:45 - 9:00	<ul style="list-style-type: none"> <li>Workshop registration.</li> </ul>
9:00 - 9:30	<ul style="list-style-type: none"> <li>Welcome and introductions</li> <li>Individual Survey</li> <li>Current knowledge</li> </ul>
9:30 - 10:30	<ul style="list-style-type: none"> <li>Climate Change &amp; Energy</li> </ul>
10:30 - 10:45	MORNING TEA
10:45 - 12:30	<ul style="list-style-type: none"> <li>Energy Technologies</li> </ul>
12:30 - 1:15	LUNCH
1:15 - 3:00	<ul style="list-style-type: none"> <li>Deliberation</li> </ul>
3:00 - 3:15	AFTERNOON TEA - Facilitators meet
3:15 - 4:30	<ul style="list-style-type: none"> <li>Key messages - clarification</li> <li>Individual Survey</li> </ul>
4:30	FINISH

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Since 2003 have conducted a range of processes. Thought I would share information about the large group process. There is a paper that describes this published in the proceedings from GHGT9 if you are at all interested can send you the link. This slide gives you an indication of the process we used. Developed from small group participatory action research.



## The large group process



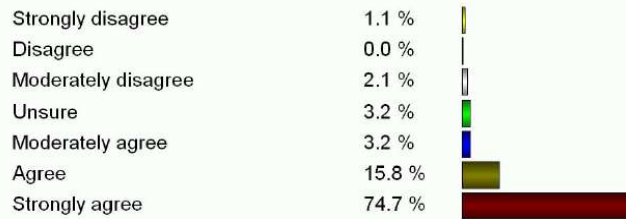
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## Context matters - climate change



S2Q3 How strongly do you agree climate change is an important issue for Australia ?



**Average: 6.51**

Need to set any discussion around energy in the context of climate change. Material presented at our workshops is developed using a group of diverse stakeholders including NGO's, government, coal industry and academia. Looked at the pros and cons of each technology and came up with the most objective information we could.

## Context matters -Options to stabilise emissions

- **Increasing the use of low emission technologies**
  - Renewables: wind, solar, hydro, biomass, geothermal
  - Nuclear
- **New lower emission fossil fuel technologies**
  - Advanced coal with carbon capture and storage
  - Natural gas with carbon capture and storage
- **Reducing energy use**
  - Energy conservation
  - Improving efficiency of use

As part of the discussion once we have looked at the causes of climate change and rises in CO<sub>2</sub> then look at mitigation options. These of course include all of the following.... As per slide above. So our trusted expert talks through each of them.

Preferred energy source/technology  
1= high preference 11= lowest preference

	Feb, 2008		Mar, 2008		Jun, 2008		Nov, 2008		Feb, 2009	
	Youth 29		Brisbane 60		Melbourne 47		Perth 62		Adelaide 131	
	Before %	After %	Before %	After %	Before %	After %	Before %	After %	Before %	After %
Solar	1.7	1.8	2.1	1.9	1.9	2.1	3.0	2.1	2.1	2.5
Wind	2.9	2.4	3.1	3.3	2.6	2.7	2.5	2.8	3.1	3.6
Wave/Tidal	4.3	4.6	4.3	4.7	4.4	5.3	4.4	4.1	5.2	6.8
Geothermal	4.2	4.0	4.9	5.2	6.1	6.7	5.5	6.1	4.8	3.8
Nat. Gas	6.6	6.2	6.5	6.0	5.6	6.1	6.6	6.4	5.8	6.0
Hydro	5.6	5.9	5.2	5.3	5.5	5.6	5.1	6.5	5.7	6.3
Biofuels	5.8	5.9	6.2	5.5	7.0	6.4	7.2	6.7	6.7	6.7
CCS	6.5	6.2	6.7	7.0	7.1	5.7	6.9	7.2	6.5	4.3
Coal	9.6	9.6	8.8	8.7	8.6	8.4	9.0	8.6	8.7	8.4
Nuclear	8.7	9.4	8.8	9.1	8.5	8.2	6.9	6.6	7.7	8.3
Oil	9.9	9.8	9.2	9.1	8.8	8.8	9.2	8.9	9.1	9.0


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Research around the world shows us that when you ask individuals to rate the range of energy technologies, renewable energies are always more favoured. CCS tends to be more slightly favoured to coal with out CCS. Coal and nuclear often tend to vie for the bottom position. One of the clear messages that arise from the discussions is that individuals do not want to see development of CCS at the expense of renewables.

How strongly do you agree with CCS 1=strongly disagree      7=strongly agree										
	Feb, 2008 Youth 29		Mar, 2008 Brisbane 60		Jun, 2008 Melbourne 47		Nov, 2008 Perth 62		Feb, 2009 Adelaide 131	
	Before %	After %	Before %	After %	Before %	After %	Before %	After %	Before %	After %
Strongly disagree	6.9	3.6	8.6	10.2	2.1	2.1	1.6	4.8	1.5	0
Moderately disagree	13.8	10.7	5.2	1.7	2.1	4.3	4.8	4.8	3.1	2.3
Disagree	0	14.3	6.9	5.1	14.9	4.3	1.6	6.5	5.3	3.8
Unsure	48.3	25	48.3	32.2	59.6	14.9	54.8	21	47.3	9.9
Agree	13.8	35.7	8.6	27.1	6.4	40.4	22.6	37.1	10.7	22.1
Moderately agree	13.8	7.1	17.2	13.6	8.5	19.1	9.7	17.7	13	38.2
Strongly agree	3.4	3.6	5.2	10.2	6.4	12.8	4.8	6.5	17.6	23.7
Missing responses	0	0	0	0	0	2.1	0	1.6	1.5	0
Total	100	100	100	100.1	100	100	99.9	100	100	100

Ashworth et al. (2008) *Engaging the public on Carbon Dioxide Capture and Storage: Does a large group process work?* GHGT9

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Results from several large group processes we have run over the last year. Each of the names represents a workshop i.e. the Youth group was held with 29 x 18 – 25 year olds; 60 individuals from Brisbane etc. Interestingly the first two groups we recruited by advertising the topic of climate and energy however, we quickly discovered that those that responded came with a vested interest and more entrenched opinions about energy technologies and the environment. So we found these were less influenced by the information. However, in the latter three these were just told the topic was of national significance to Australia so we had a much more random sample of the Australian population.

For each group they were asked to complete a survey at the beginning and the end of the day, the first when they came into the room and before any information was presented to them. The second at the end of the day after all of the information and the time for deliberation. What is interesting is that you can see how many people are unsure about CCS when they come into the room but by the end many of them have shifted to a more positive position. Hence why we suggest it is important to engage individuals early in the debate.

## Questions about CCS

- *“Have any studies been done on ways to use CO2 emissions for practical uses thereby creating a recycling effect rather than just bury it?”*
- *We need to know more about it before widespread application - Is it safe? What are the long-term effects? Is it a cover-up operation – will it give companies that invest in this technology the appearance of looking green without actually doing anything?*
- *CCS is not an answer but can be a bridge for other technologies. I thought it was bad but now I have changed my opinion.*
- *What is payback period for building CO2 sequestration, brings jobs and progress but how many emissions?*
- *CCS is a pipedream; there is not concrete evidence of it working*
- *How far down the track is carbon sequestration? How soon can we implement? How long can we use the special sequestration spots?*

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This slide is really to show you the range of questions we receive about CCS. Along with the basic ones such as:

Is it safe?

Will it leak?

How long will it stay there?

How much will it cost?

I think these questions demonstrate that general public are able to grasp such a complex issue as long as you can present material in terms that they can understand. Really come up with the same sort of conclusions experts and policy makers would also make.

## Conclusions for communication

- Varying levels of knowledge about climate change and its causes – need this to accept CCS
- Still limited knowledge about CCS
  - Knowledge greater among more educated participants
  - Very little knowledge of the potential scale required
- Any communication needs to be in context of climate change mitigation – suite of options
- CCS is a bridging technology to a more sustainable future
- CCS investment not at expense of renewables
- Need to provide scientific based information, includes benefits and risks
  - Quality and objectiveness of information
  - Need for a trusted expert as the messenger
- Communication about how other people or organisations view CCS will influence acceptance – what are the messages

As per slide

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