



Nick Otter, Interim CEO, GCCSI, April, 2009

[www.csiro.au](http://www.csiro.au)

## Our role in public perception of CCS

P2010/66

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Presentation to CAGS CO<sub>2</sub> Workshop, 19<sup>th</sup> January 2010



# Commonwealth Scientific & Industrial Research Organisation (CSIRO) today: a snapshot

**Australia's national science agency**

**One of the largest and diverse in the world**

**Ranked in top 1% in 13 research fields**

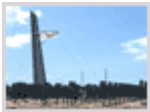








**Internationally recognised staff**

**Over 6000 employees**

**Building national prosperity & wellbeing**



# CSIRO Flagship Program

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

# The value of social research and communication

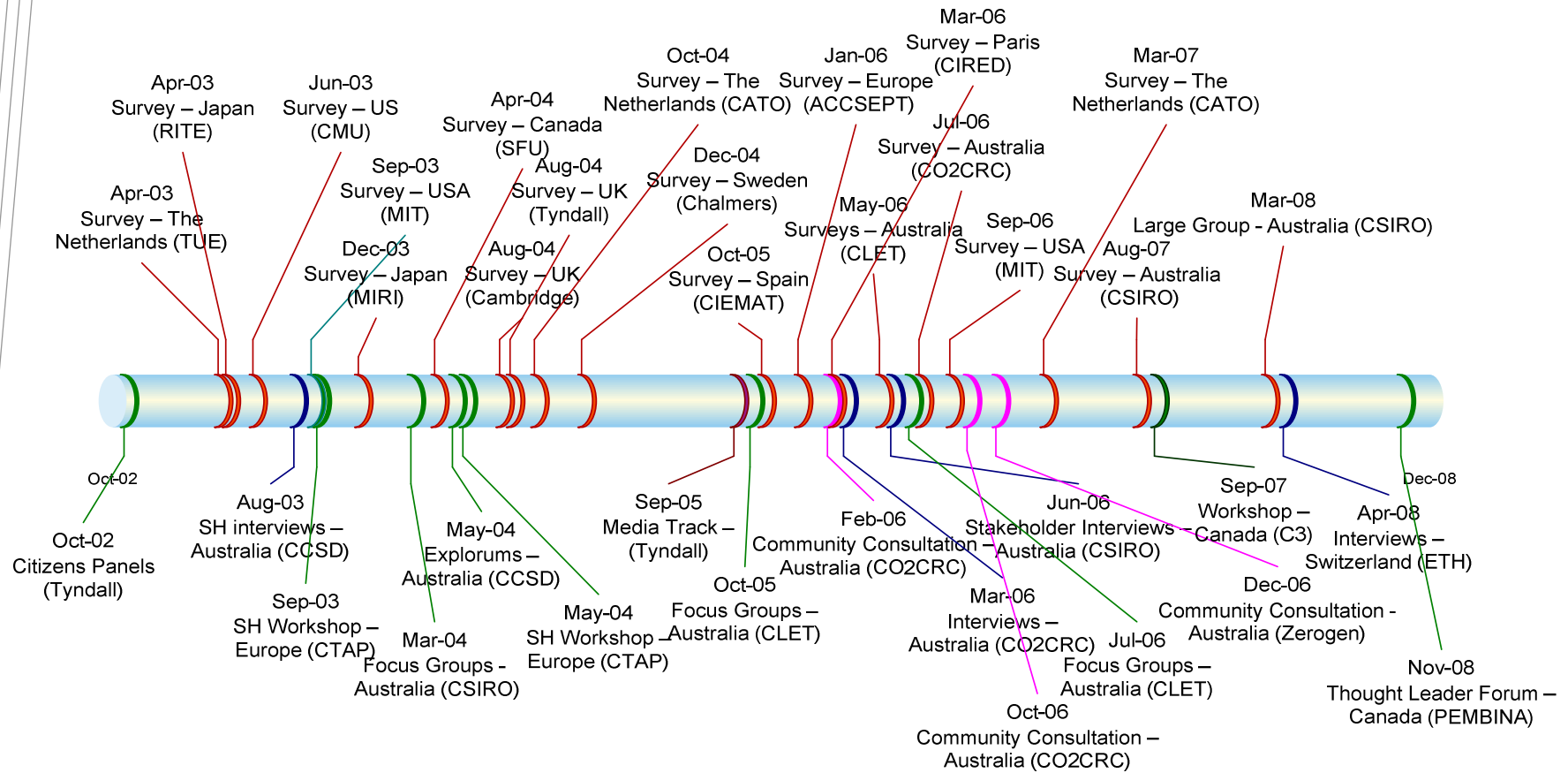
- A major risk to technology adoption is if there is no appropriate engagement with stakeholders during the development process.
- Public attitudes to new technologies can change over time however, once formed they can be slow to change
- Social research can
  - enhance technology outcomes through a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



# Target audiences

<b>Influential Stakeholders</b> Politicians Media Finance CEO's Insurance NGO's Policy Makers	\$\$\$\$ Special functions Large group process
<b>Community</b>	Energymark – round table discussions
<b>Education</b>	Energy savings handbook Scientists in Schools, CarbonKids!
<b>Project specific</b>	Local regions

# Roadmap of CCS Communication Activities



Survey  
Interviews  
Focus Groups & Workshops  
Community Consultation  
Media study



# Common findings: Benefits and concerns

BENEFITS	CONCERNS
It may provide a good bridge to the future low carbon economy	Safety risks of a CO <sub>2</sub> leak
If successful, we can avoid large quantities of CO <sub>2</sub> from release to the atmosphere	The risk of contamination of ground water
Allows continued use of fossil fuels, which provides an economic advantage for some countries	Will it harm plants and animals near storage sites?
Enhanced energy security around the world	Assumption that CO <sub>2</sub> is explosive
Helps to clean up coal fired power plants for developing countries who need access to energy	Is it the wrong solution for climate change, a band-aid?
Allows emissions to be reduced without having to change lifestyle too much	Are there enough available storage sites?
	It appears to require a large infrastructure which does not necessarily exist today
	Long term viability issues
	Cost – economic efficiency
	Scale required for successful CO <sub>2</sub> mitigation
	It is an unknown technology
	Should not be pursued at the expense of renewable energy sources

Source: Ashworth et al. (2009). From research to action: Now we have to move on CCS communication. *International Journal of Greenhouse Gas Control*



# CCS Consultation in China

Project	Authors	Feature
BP/DTI CCP2 Communication	Reiner et al., 2007	Cambridge in collaboration with Chinese Academy of Social Science, China Coal Information Institute and South China University of Technology
EPRG	Liang, 2008	Aim to understand the institutional framework of Chinese sector, more qualitative assessment.
CAPPCCO	Reiner & Liang, 2008	Focus on industry opinions and investigated stakeholder behaviour patterns in decision making
HIT Study	Liang & Wu, 2009	Conduct semi-structured interviews to acquire information about barriers and incentives for the CCS deployment in China
STRACO2	ACCA21, 2009	Understand technology and policy preference, risks concerns as well as potential financial sources
NZEC	Reiner & Liang, 2009	Investigate the technical, regulatory and financial schemes for the first CCS demonstration project as well as long term deployment

Source: Reiner & Liang, 2009. Stakeholder Perceptions of Demonstrating CCS in China p.42

<http://www.nzec.info/en/assets/Reports/CamNZECWP52finalrevisions97-03v28aug09Update.pdf>





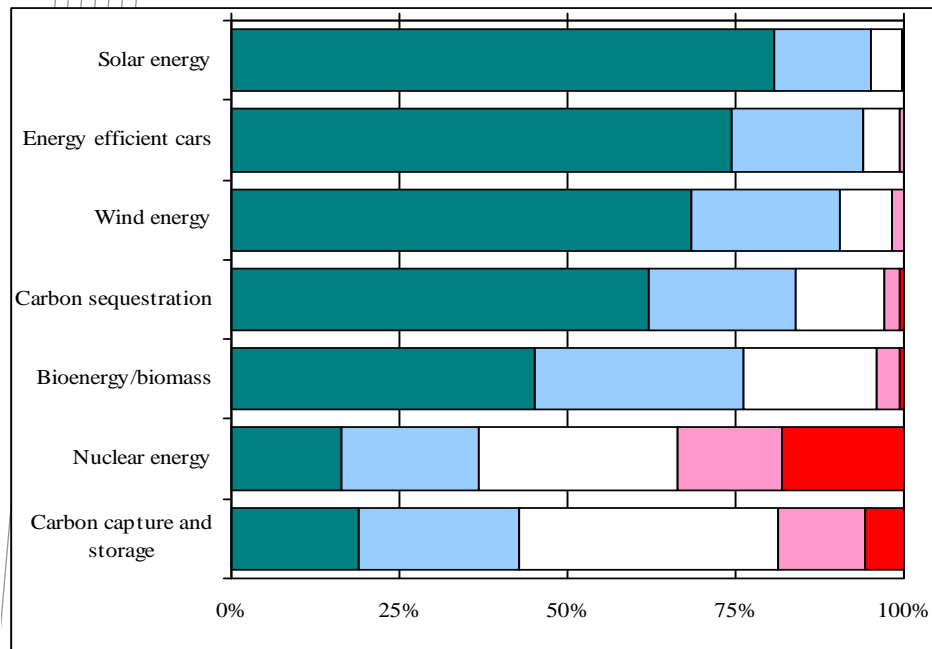
# Preferred energy source/technology

1= high preference 11= lowest preference

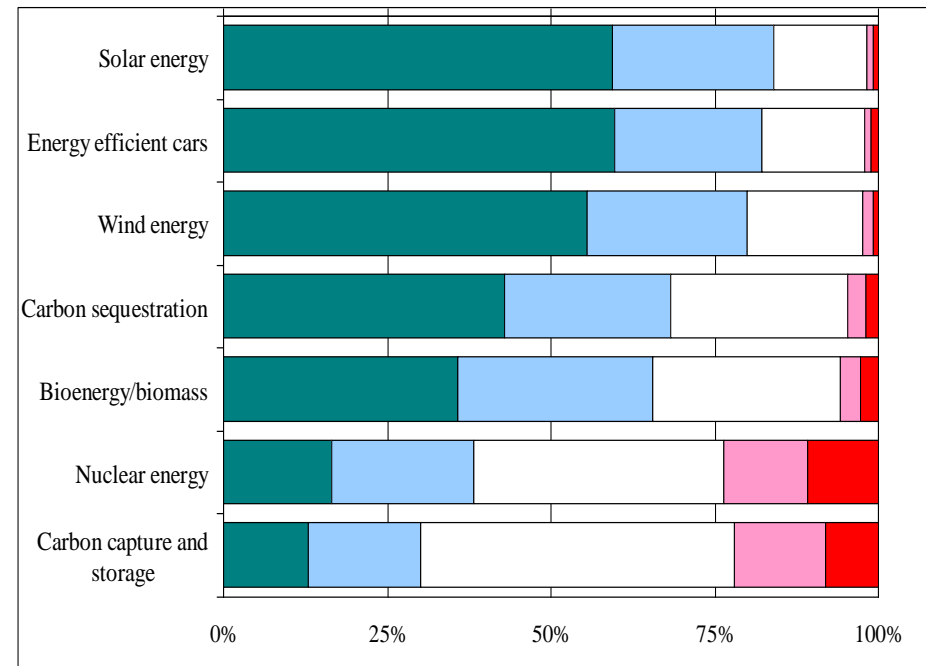
	Feb, 2008		Mar, 2008		Jun, 2008		Nov, 2008		Feb, 2009	
	Youth 29		Brisbane 60		Melbourne 47		Perth 62		Adelaide 131	
	Before %	After %	Before %	After %	Before %	After %	Before %	After %	Before %	After %
Solar	1.7	1.8	2.1	1.9	1.9	2.1	3.0	2.1	2.1	2.5
Wind	2.9	2.4	3.1	3.3	2.6	2.7	2.5	2.8	3.1	3.6
Wave/Tidal	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

# Preferred energy technology to address global warming

## Australia



## US

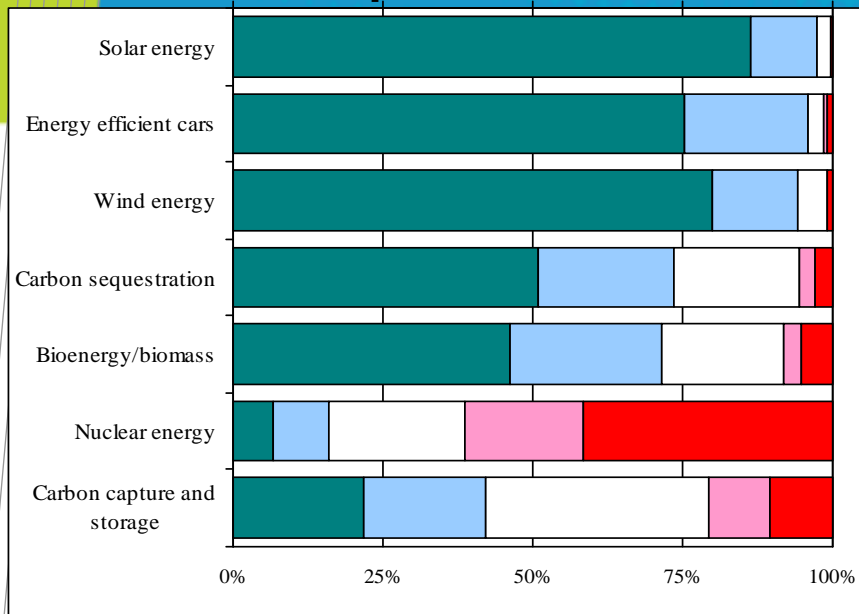


Definitely use
  Probably use
  Not sure
  Probably not use
  Definitely not use

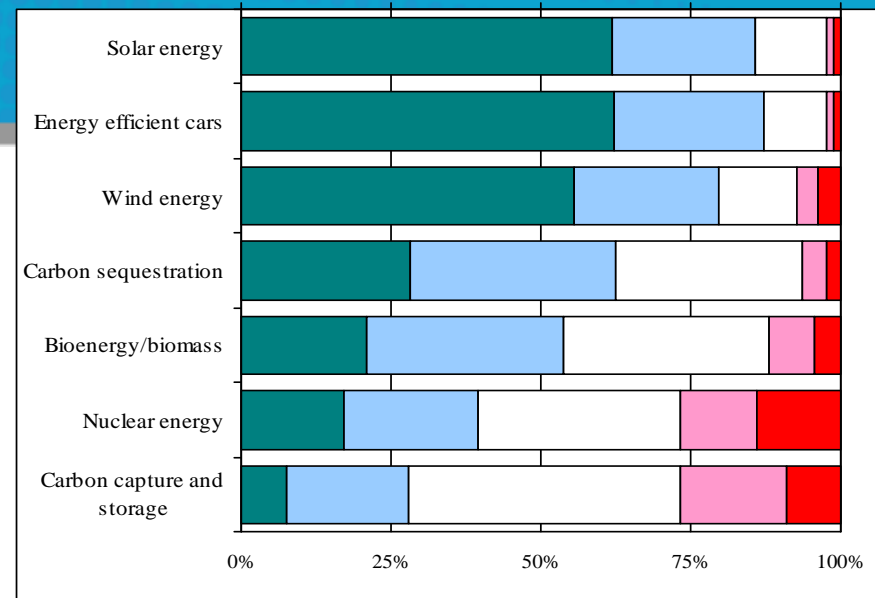
D. Reiner et al., (2007) *An international comparison of public attitudes towards carbon capture and storage technologies. GHGT-8*



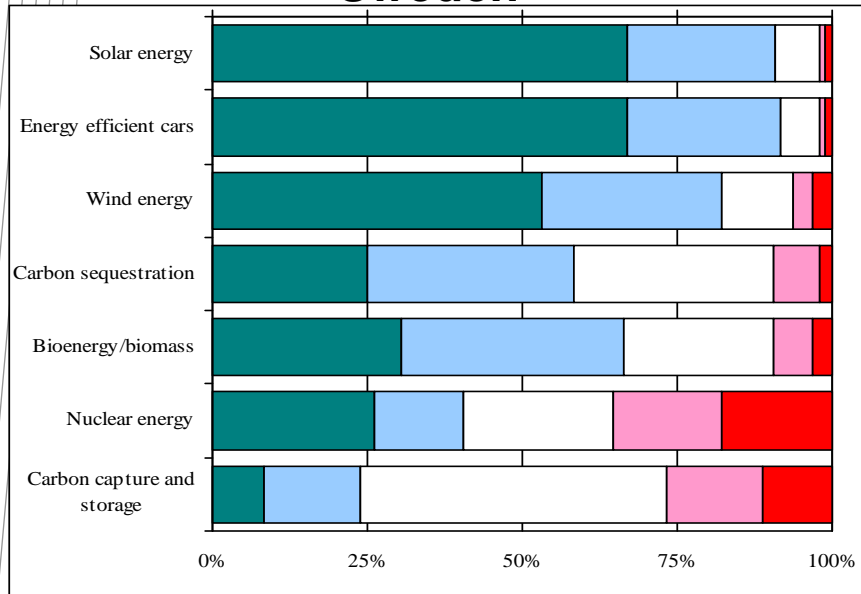
## Spain



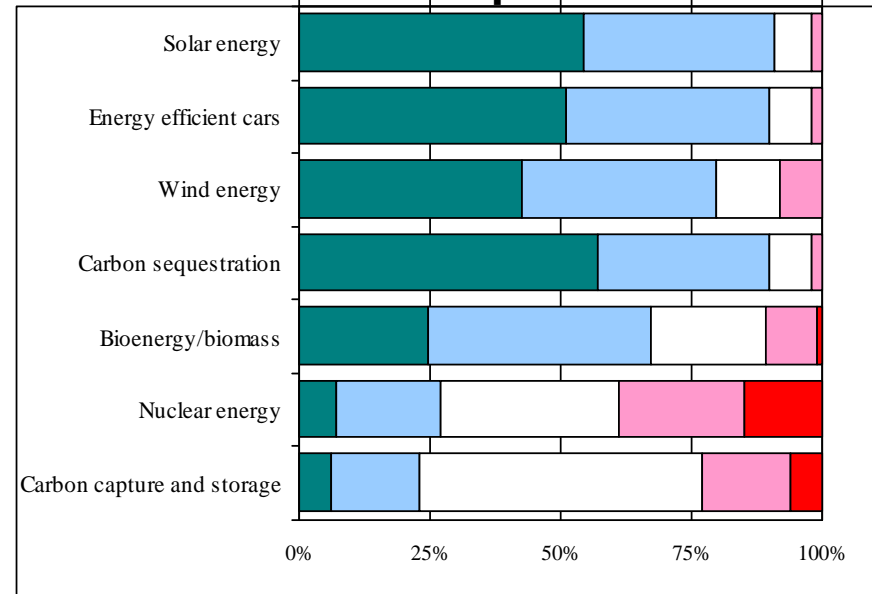
## UK



## Sweden



## Japan



■ Definitely use  
 ■ Probably use  
  Not sure  
 ■ Probably not use  
 ■ Definitely not use

# How strongly do you agree or disagree with CCS

1= strongly disagree 7= strongly agree

	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 %
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

# US DOE Regional Partnerships – Predominance of Social Concerns

- Among all groups, most strongly expressed concerns were:
  - trust in authority
  - concern about the fairness of CCS implementation procedures
- Public perceptions of the risk of technology do not occur in a vacuum. People bring to their evaluation of a particular technology their cultural frame of reference: differing values, experiences, way of interpreting and responding.
- Technology and decisions about risk (level and acceptability) are essentially social in origin and effect.
- Resolution of safety issues related to leakage, seismicity and containment are essential to successful deployment of CCS.
- But, *management* of these risks is the critical factor for public acceptance
  - How can we **have a say** in what happens?
  - Will the process be **fair** and will anyone **listen** to us?
  - Can we **trust** the project developers and government to take care of problems
  - What have our **previous relationships** with these entities shown us?
  - What is the **benefit** to the community
  - How does the project fit or **improve** our way of life?

# Stakeholder perceptions of demonstrating CCS in China

- Assess the potential challenges and opportunities for CCS projects
- Criteria used to determine sample population:
  - “have significant current or potential influence on CCS demonstration projects or deployment in China”
  - Regional and sectoral sample population diverse in nature
  - Limit of 30% of each type of institution & less than 20% was from community working directly on CCS
- Surveyed 131 Chinese stakeholders from 68 key institutions
- 27 provinces and regions
- 31 face to face interviews and an online survey
- 60% of respondents outside of Beijing
- 90% spent more than half their time on energy and environment issues
- Less than 20% spent half of their time or more on CCS

Source: Reiner & Liang, 2009. Stakeholder Perceptions of Demonstrating CCS in China  
<http://www.nzec.info/en/assets/Reports/CamNZECWP52finalrevisions97-03v28aug09Update.pdf>

# Results: Stakeholder perceptions of demonstrating CCS in China

- “CCS and climate change are relatively new topics in China”
  - 90% had heard of both CCS and climate change
  - 7% heard only of climate change
  - 4% heard of neither
- 21% felt climate change is a serious problem in the near future
- 45% felt climate change will be a serious problem in the distant future
- Over 80% felt it would be difficult or very difficult to achieve a deep cut in emissions in China over the next 20 years
  - Most believed coal dominated energy sector will not change in China in near future
  - Optimistic: Current ambitious national energy conservation policy
  - Skeptical:
    - Growing demands for energy related to increased GDP;
    - Constraints on implementation with current environmental regulatory framework;
    - Perceived higher urgency of serious local pollution problems i.e. water and air quality

Source: Reiner & Liang, 2009. Stakeholder Perceptions of Demonstrating CCS in China  
<http://www.nzec.info/en/assets/Reports/CamNZECWP52finalrevisions97-03v28aug09Update.pdf>



## Results: Stakeholder perceptions of demonstrating CCS in China

- Chinese stakeholders generally believed the energy penalty from CCS would have a negative impact on the security of energy supply
  - Contrasts with other parts of the world
- Perceived advantages of developing CCS demos in China
  - Demonstrate Chinese governmental effort in combating climate change
  - Potentially creating an advantage for Chinese power companies for investing in CCS technologies
- National Development and Reform Commission (NDRC) perceived as most important institution in authorising first commercial scale CCS demo projects.
- Next local government, Ministry of Science and Technology (MOST) and Ministry of Finance (MOF)
- NDRC & Ministry of Environment Protection (MOEP) – regulating and monitoring operations of CCS demonstration projects

Source: Reiner & Liang, 2009. Stakeholder Perceptions of Demonstrating CCS in China  
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# Considerations for consultation

- 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 for a trusted and knowledgeable expert as the messenger
- Greater emphasis needed on procedural and management concerns
- Associated need for upfront social analysis and planning
- Need to provide scientific based information, includes benefits and risks
  - information on natural/industrial analogues will assist risk perception
- Communication about how other people or organisations view CCS will influence acceptance – what are the messages

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# Thank you

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