



# summary report of the 3rd IEA GHG social research network meeting



IEA GREENHOUSE GAS R&D PROGRAMME



## International Energy Agency

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IEAGHG supports and operates a number of international research networks. This report presents the results of a workshop held by one of these international research networks. The report was prepared by IEAGHG as a record of the events of that workshop.

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# In Memoriam Dancker Daamen



*On the 27<sup>th</sup> of September 2012, a colleague and friend was sadly taken from us during a sailing trip. Dancker Daamen was a leading member of the steering committee of IEAGHG's Social Research Network, was a well-respected and liked researcher. His input to the SRN in particular was no small effort, where his active and enthusiastic contributions were hugely appreciated, and he will be sorely missed.*

*Dancker will be remembered by friends and colleagues as a dedicated researcher, always ensuring his results were sound, before communicating them, and he always aimed to inspire fellow scientists to achieve similar goals. Dancker will leave a hole in the research community.*

## Steering Committee

Peta Ashworth, CSIRO (Chair, Host)

Tim Dixon, IEAGHG (Co-Chair)

Kenshi Itaoka, Mizuho Information & Research Institute

Dancker Daamen, Leiden University

Minh Ha Duong, CIRED

Sarah Wade, Wade LLC.

David Reiner, University of Cambridge

Sallie Greenberg, University of Illinois

Ameena Camps, IEAGHG

Samantha Neades, IEAGHG

The International Steering Committee also wishes to acknowledge Talia Jeanneret of CSIRO and Laura Davis of IEAGHG for their hard work during the organisation process of this workshop.

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# Introduction

The overall aim of the Social Research Network is “to foster the conduct and dissemination of social science research related to CCS in order to improve understanding of public concerns as well as improve the understanding of the processes required for deploying projects”.

The objectives of the Network are as follows:

- Ensure high quality social science research
  - Elevate reputation and acceptance of social science research
  - Consistency of research
- Identifying gaps
- Promoting a learning environment
- Building capacity within the Network
- Translate information from studies into tools or applied lessons
  - Apply insights to actual projects
  - Interact with technical experts
  - Communicate results to policy makers
  - Ensure application is grounded in theory
- Create a clearing house of social science research

This 2012 meeting, the third of the IEAGHG Social Research Network, was held in Noosa Heads, Australia from the 12<sup>th</sup> to 13<sup>th</sup> of April. The meeting was hosted by CSIRO and sponsored by the Global CCS Institute, CSIRO Advanced Coal Portfolio, CO2CRC and DPI Clean Coal. Over 40 delegates attended this successful meeting from 8 different countries.



**IEA Greenhouse Gas R&D Programme**

**3rd Social Research Network Meeting**

**Hosts : CSIRO**  
**Sponsors : CSIRO, Victoria Department of Primary Industries, GCCSI, CO2CRC**

**Noosa, Australia, 12-13 April 2011**

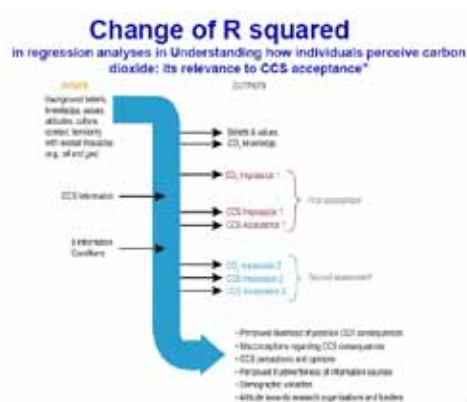
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# Session 1: Methodologies and Techniques

**Peta Ashworth, CSIRO – “Comparison of large group process”**

In terms of the description of the process used, this research looked at the views of individuals on climate change/energy technologies and to enable discussion on such topics, facilitating assessment of the impact of the information given. This data collection studied the building of a group identity, trust in presenter/information, knowledge or attitude change in different countries and what influenced such changes. The researchers found that all reported an increase in their knowledge of greenhouse gas emissions throughout the day and there was a recognisable change in the approval of CCS – Australia and Canada were generally more positive, whereas the Netherlands and Scotland decreased in positivity – demonstrating that there are many different factors influencing this and context matters. The results looking at support for energy technologies showed considerable variation between the technologies.

*Kenshi Itaoka, Mizuho Information and Research Institute – Regression and interpretation*



*Slide Courtesy of Kenshi Itaoka*

R squared is interpreted as the ratio of variance explained by a regression model, the total sum of squares around the mean. This method is used mainly for analysis of partial correlation between factors, to avoid interpreting simple correlations incorrectly, and also to find the causal inference. The size of R squared does not generally matter in a social science setting (except perhaps when influencing policymakers), but if the value is low then it should be explained (at least in terms of whether important covariates are or are not included). If R squared is high, this could cause problems in that it could hide the effect of other variables.

To ensure more accurate results when using R squared in a social science setting, it is important to list all potential influencing factors, to check simple correlations, conduct multiple regressions, check the linearity and conduct an SEM (path analysis).

*Gerdien de Vries, Bart W. Terwel, Naomi Ellemers, and Dancker D.L. Daamen, Leiden University – “The Dilution Effect in Evaluations of Persuasiveness of CCS Information”*

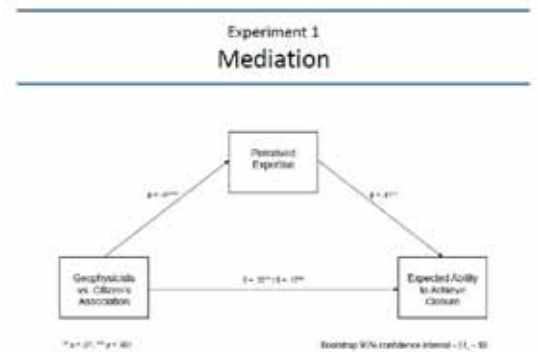
CCS opinion is highly influenced by a number of types of communication – positive and negative. Much of the current CCS communication material contains multiple messages, varying opinions and non-relevant information for forming an opinion (so called ‘non-information’). This study investigates whether the inclusion of non-relevant information to relevant information dilutes the effect of the relevant information – the ‘dilution effect’, an important concept which could influence attitudes.

Using an experimental methodology, a dilution effect was observed when non-information was added to positive highly-relevant information, but not when positive low-relevance information was added. Subjects in all conditions regarded the highly-relevant material as more relevant than low-relevance information, and low-relevance information as more relevant than non-information.

For positively and negatively framed CCS information, a dilution effect occurs on persuasiveness when non-information is added to highly-relevant information. It seems that this effect does not occur when low-relevance information is added. In public communication strategies, CCS stakeholders should be aware of the dilution effect and must take into account the relevance of the material – non-information could weaken the persuasiveness of their high-relevance information (both positive and negative).

**Charlotte Koot, Emma ter Mors, Naomi Ellemers, and Dancker D.L. Daamen, Leiden University – “Source expertise, consensus and the ability to achieve closure”**

Public support is important for the implementation of CCS, but public knowledge on the topic is relatively low. There is a motivational need by persons for cognitive closure; the ability to make decisions with certainty and that you feel you can confidently know what your attitude is. This research is looking at factors that influence people to achieve cognitive closure and the precursors (elements of communication that affect whether people are able/less able to say what they think about the subject) of the ability to achieve closure. This research looked at whether people value the expertise of the source to achieve closure and at the general consensus (or non-consensus) of the piece of information.



Slide Courtesy of Charlotte Koot

For both conditions, the consensus was found to also affect the perceived expertise. It seems that expressing consensus (or not) appears to have little effect on the ability to achieve cognitive closure when the information source is generally considered as expert.

### Conclusions

Delegates noted that some recent polling results are actually showing that opinions as to whether climate change actually exists are dropping – there seems to be a real perceived lack of acceptance of the science, in particular when there is a lack of consensus in the scientific community. The early results of the large group process show they may be useful to educate and influence stakeholders on complex processes. It is difficult to form attitudes about complex topics like CCS.

## Session 2: Findings Related to CCS, Part 1

**Suzanne Brunsting, ECN – “Social Site Characterisation of Potential CCS Sites in Poland and the UK”**

Social site characterisation is instrumental to plan, evaluate and approach a way to actively engage local stakeholders in prospective CCS projects. This characterisation is focussed on two sites in Europe and the information publicly available on these potential projects. The results from the two sites were similar in some ways (both in rural areas, small towns, where unemployment is a concern and climate change not a major concern), there was an existing low/very low awareness of the local CCS plans but general high expectations of CCS (largely related to potential job opportunities brought into the area). Any concerns voiced were due to potential leakage, the Polish site test population was concerned with the gas reservoir below the drinking water reservoir and the UK (Scotland) site population voiced concerns with the effect on water purity.

Social site characterisation so far has provided a vast amount of information on what public outreach should consist of and the methods that should be undertaken to carry out such a task. Content should be transparent, should explain CCS in terms of climate change (as awareness is low), give some expectations management, address any known knowledge gaps and address the risks of CCS.

**Jonas Pigeon, Universite du Havre – “Social feasibility of CCS projects along the Seine waterway axis”**

The research was conducted in the chosen area as it accounts for 20% of the CO<sub>2</sub> emissions in France (a highly industrial area including many petrochemical companies, an area designated as low carbon). The area sits atop the Paris Basin, an area with suitable saline aquifers for CO<sub>2</sub> storage. In Norway, it was found that the state was very strongly supportive at the beginning but this decreased with time. There are good relationships between technology users, researchers and technology providers. To learn on implementation of CCS in other countries, the researchers also visited Norway and Scotland, where both are supportive of the technology. To conclude, the examples show the importance of actors

involved in CCS projects. The understanding of these principles could enable us to improve the design of projects. Taking into account spatial development dimension and social practices related to spatial areas/local identities could provide recommendations for the design of a CCS technological system in the Seine waterway axis.

***Amanda Boyd, University of Calgary – “Views and perceptions of Canadian communities to CCS”***

Local opinions are critical to projects, but little is known about the effect of an alleged CO<sub>2</sub> leak on opinions. Weyburn allowed us to look into this. The alleged ‘leak’ situation could be classed as a ‘focussing event’ which can be used by groups to elevate attention to a problem (it is important to note that a focussing event may not be completely negative). This research was concerned with examining and contrasting views of CO<sub>2</sub> injection in communities (one project with little opposition and one with a cancelled project).

The research looked at two sites in Canada, Weyburn/Goodwater and Priddis (Calgary). Methods used included interviews (group and individual) with community members and key stakeholders, along with observation and attendance at community events/meetings. The two sites are not comparable as the questions were tailored differently for each site. In terms of results, the Weyburn/Goodwater community disagreed with the leak allegations and showed more trust in companies, scientists and monitoring technology. It was noticeable that allegations of leaks had caused major conflicts in the communities. For Priddis, the Weyburn leakage allegations coincided with the consideration of the project, and contributed to its being stopped by landowners concerns. These results show that allegations or a similar negative event can impact development and community acceptance. This could be a major factor in future developments and it is key to recognise the importance of monitoring at projects and also necessary to prepare communication material to address potential areas of concern, such as a leak.

***Bart Terwel, Leiden University – “Initial public reactions to CCS: Differentiating general and local views”***

Local opposition might be categorised into 3 categories – anti-CCS sentiments (e.g. due to perceived tampering with nature), anti-process sentiments (e.g. perceived procedural unfairness) and NIMBY (Not In My Back Yard) sentiments. It was found that initial reactions to a local storage project are not necessarily dominated by NIMBY sentiments. The attitudes of “onsite” (but not “offsite”) residents were influenced by concern with the risk of storage procedures to local residents’ safety. The trust in the government has a significant effect on people’s judgements regarding the risks and benefits of the potential project – which will have an effect on residents’ inclination to protest. It appears that the initial public reactions to storage projects are unrelated to the concern about climate change (even if the population is aware that it is seen as an important strategy to meet CO<sub>2</sub> emission reduction targets by scientists/policymakers).

## **Conclusions**

One of the issues that was discussed included the importance of societal conditions – understanding what are important local issues, the importance of societal issues that may impact project acceptance, note that safety risks are important (but not the only factor), knowing that the trust in government will impact outcomes and judgement and the awareness that context is important. The role of various actors is important – the information source makes a difference, the role of trust/credibility is key, we must think how to create a shared vision and must not forget the importance of politicians – they are influential stakeholders. We must consider the impact of the focussing event on the overall positions, in predictability, who buys into the discussion etc.

# Session 2: Findings Related to CCS, Part 2

*Anne-Maree Dowd, CSIRO & Aya Saito, Mizuho Information and Research Institute – “Understanding how individuals perceive carbon dioxide”*

This is an investigation of how citizens of three countries (Japan, Australia and the Netherlands – 2470 participants in total) perceive CO<sub>2</sub>. It attempts to relate individual perceptions of CO<sub>2</sub> to perceptions of CCS and determine how information provided about the underlying properties and characteristics of CO<sub>2</sub> influence individual attitudes towards low carbon energy options, particularly CCS. Regression analyses carried out showed the effects of the provision of information on CO<sub>2</sub> – it was found that providing information describing the characteristics of CO<sub>2</sub> had a generally positive effect on people's opinions on CCS implementation. Information describing CO<sub>2</sub> natural phenomena, like hot springs and including CO<sub>2</sub>, seemed to have a negative influence on CCS implementation, as did information provided on the behaviour of CO<sub>2</sub> during the CCS process.

Recommendations from this work suggest that efforts to promote understanding of CCS should include information on the properties (balanced/complete information in this case) and chemistry of CO<sub>2</sub>. Information on the basics of climate change, CCS and CO<sub>2</sub> in general may be required by some. Topics deemed important by respondents should be collected and then addressed in communication material. Care should be taken in describing CO<sub>2</sub> natural phenomena and the behaviour of CO<sub>2</sub> in CCS – the information must be open, transparent, correct and complete.

*Suzanne Brunsting, ECN – “The influence of knowledge versus perceptions of CCS on public attitudes towards CCS in the Netherlands”*

Perceptions are items to which there is no clear right or wrong (e.g. opinions), compared to knowledge which is items that are clearly right or wrong. It is interesting to see if knowledge can predict perceptions of CCS. This research was originally done in 2010 and repeated in late 2011. Results show that the awareness of CCS has increased (where knowledge hasn't), there appears to be a neutral attitude to CCS and there is a lack of understanding of the role of CO<sub>2</sub> in climate change. There are uncertainties in the subject – mainly about the goals/consequences of CCS and CO<sub>2</sub> sources, characteristics and effects.

The model suggests that public communication strategies on CCS (to/for the general public) should focus on education on CO<sub>2</sub> (sources, characteristics and effects) and should debate about the benefits of CCS and the risks of leakage of CO<sub>2</sub>.

*Bart Terwel, Emma ter Mors, and Dancker Daamen, Leiden University – “It's not only about safety: Beliefs and attitudes of 811 local residents regarding a CCS project in Barendrecht”*

This focused on the relationship between beliefs and attitudes towards CCS plans, namely the Barendrecht project in the Netherlands. Questions were asked via telephone interviews and the overall opinion of the project was negative – 86% of respondents thought the project was unacceptable. Participants were asked on the beliefs of the CCS plan (i.e. on helping to combat global warming, potential of the plans to lead to a loss on property value) and on safety (i.e. safety of capture, transport and storage). Questions were also asked on the decision processes/parties involved (e.g. trust, procedural fairness) and on information provided.

The perceived attributes of a CCS plan (perceived safety of transport/storage, likelihood of loss of property value) were found to affect attitudes. A good process (regarding the CCS plan) is important to deal with credibility issues, perceived unfairness of the decision procedure and lack of trust in decision makers. In terms of lessons learned, there are at least two conditions for local support (good attributes and good process), there is a need for credible information on safety as well as effective compensation for losses and there is a need to enhance public trust.

*Declan Kuch, Asha Titus, Stephen Webb, University of Newcastle – “Coal Innovation in Action: Using ANT to study Carbon Capture and Storage”*

Actor Network Theory (ANT) is a qualitative way of studying the social context and techno-scientific content of CCS – a way of understanding associations between humans and non-humans ('things' that can modify human behaviour). This

project aims to understand what makes a good innovation unstoppable, to develop a model of how social and technical aspects of CCS project work together and to understand public perceptions of low emission coal technologies. The appeal of ANT is that it draws attention to the way demonstrations of the technology developed over time and the way networks of power grew between scientists and other actors. It was observed that there were different risk rationalities that organised the working culture, which meant that these different groups would hold different notions on the matter. This is key in looking at how to coordinate between these differing 'appetites' for risk.

### Conclusions

The properties of CO<sub>2</sub> should be included in CCS communications as should topics that have been deemed important by the public. Information provided has to be transparent, correct and complete. The perceptions of CCS are more powerful than the knowledge, although knowledge does play a role in shaping CCS attitudes. The public should be educated on the effects of CO<sub>2</sub>, and should debate the benefits and risks of CCS. For project success you need good attributes (safety, no loss) and a good process (fair decision).

## Session 3: The CCS Ethical Landscape

**Philip Boucher, Tyndall Centre – “Mapping Ethical Landscapes of Carbon Capture and Storage”**

This study uses an ethical matrix approach, consisting of a list of actors and ethical principles. The issues are then identified in the individual cells, a top-down approach. This ethical landscape method is a data-led analytical structure (the data defines the boundaries and content), uses limited resources (no actual participation and using only secondary data), has coded content (so provides a visual map of the ethical landscape) and has allowed the researchers to identify ethical faultlines (areas of potential ethical contention). The benefits to this methodology is that it requires low resources, is a fast approach to scoping and imitates a bottom-up approach through a data-led structure. However, limitations are that there is no actor validation, no account for heterogeneity and that it is flat – there is no account for power, enrollment or representativeness.



Slide Courtesy of Philip Boucher

This work has a strong potential as a preliminary study. It identifies issues which could be looked at in more depth in an additional study and could be used as a starting point for a two-step participative/deliberative approach. The study was undertaken at various scales and positions ethical framings within broader semiotic regions.

### Panel Discussion – Philip Boucher, Judith Bradbury, Fabien Medvecky

The features of CCS development can be framed in ethical terms. An ethical matrix can be useful to explore the ethical landscape of a technology, potentially identifying divisive issues. The CCS Ethical landscape is dynamic and to consider ethical implications we must gain broader and deeper understanding of character and foundations of ethical perspectives – as well as points of convergence and divergence. It is important to consider what motivates us to have the ethical views we do and explore assumptions inherent to these views. Further consideration of intergenerational justice in the climate change and CCS debate is needed. Project developers and social scientists have different roles in the debate. Is there a role for social scientists as practitioners? Is it possible to foster a deliberative process – and is there time for such deliberation?

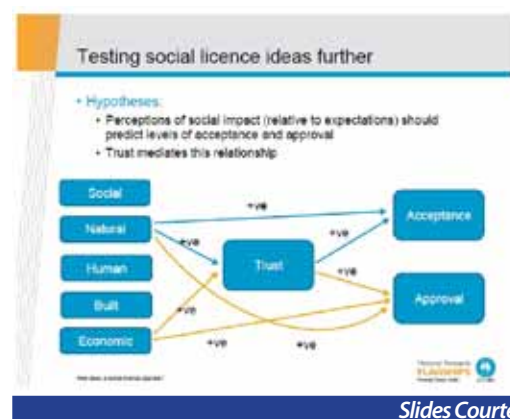
# Session 4, Part 1: From Outside the Circle: Role and Use of Social Science Research and its Application in Other Sectors?

## *Frances Bowen, University of London – Managerial perceptions of low carbon technologies*

How managers perceive climate change and decide when to share information is important, but it is also as important to consider the managerial perceptions of scale (it seems to explain much of the current inactivity in this area). Here, a Canadian oil sands company has been looked at, along with OSLI – the Oil Sands Leadership Initiative, a collaboration of parties in Canada. Oil sand extraction is very energy intensive and there is very little intention to use carbon capture and storage as part of the operation. They are quite open about not wanting to perform CCS on oil sands. Much of the talk about managing impacts in the oil sands revolves around scale, with two dimensions of scale – perception of scale of the issue and perceptions of the scale of the initiative needed to deal with it.

Issue scale perception is the magnitude/extent of impact, the timescale, issue interdependence and solution search effort. Initiative scale perception is concerned with the capital investment and risk, the time horizon, number of participants and boundary clarity. It is interesting to look at how fast you can move depending on the scale of the issue/initiative (smaller tends to be faster). This brings about several implications – one being the dilemma of whether to pursue initiative – small may give incremental, quick, small wins (but inadequate of address the overall problem) and large initiatives may promise a comprehensive solution, but are slow to structure or implement. Another implication may be to speed up climate initiatives – to do so managers must reduce the perceived scale of the issue and link climate change with smaller scale issues. It is key to manage the PERCEIVED scale.

## *Kieren Moffat, CSIRO – Coal Seam Gas project*



A 'social licence to operate' needs ongoing acceptance from the local community (and other stakeholders), meaningful partnerships between all stakeholders and a set of expectations as to how it will operate. A discourse analysis was carried out to look at a mining councils sustainability reports (in particular the social licence) and consideration given to social psychology (in

particular how groups in conflict can improve their relationship). The model of expectation was tested through regression and results show that trust is an important and central variable – the only consistent predictor of acceptance/approval. Trust is a mediator of the relationship between natural/economical capital and acceptance/approval and it mediates the relationship between contact with company employees and negative behavioural intentions. Future work will focus on these relationships and it is important to work out how to facilitate trust in the CCS world.

## *Makoto Akai, AIST – "Discussion on energy portfolio of Japan under a new myth"*

Social responses to the recent Fukushima nuclear accident can be divided into short term (including mass evacuation and rationing of supplies) and mid/long-term (including long-term evacuation and fear of radiation). The main similarities between nuclear and CCS were identified as both having a huge energy infrastructure, both low carbon technologies and both have similar characteristics of risks (in geological storage). Differences included the importance of the hazard (radiation versus CO<sub>2</sub>) and generating profit versus imposing costs under normal operation.

Observations of Japanese society show they have a poor knowledge of politicians on energy issues, there is an emotional discussion on the energy portfolio (e.g. nuclear versus renewables) and arguments put forward by non-expert 'intellectuals' can be particularly harmful to society's opinions. In Japan, it has been suggested that steps should be made in order to improve the social opinion, including improving the energy literacy, restoring public confidence in scientists, experts and policymakers, educate the media to a higher extent and encourage scientists, policymakers etc. to work together with social scientists as practitioners.

### Conclusions

Managers are people too, and they are influenced by their perceptions of scale, scale of the issue and scale of the solution. A 'social licence to operate' is needed from local communities. Social science research on CCS is bordering applied, practical studies and heterogeneity is important when tailoring communication. After the Fukushima accident in Japan, the majority of the public now have an attitude opposed to nuclear and governments/scientists are losing the public's trust. It is important to promote improving energy literacy.

## Session 4, Part 2: From Outside the Circle: Role and Use of Social Science Research and its Application to CCS?

*Emma ter Mors, Bart W. Terwel, Dancker D.L. Daamen, Leiden University – "The potential of host community compensation in CCS facility siting"*

Local public opposition is an obstacle to siting various facilities (power plants, prisons etc.), primarily due to the imbalance between costs/risks and benefits. Perhaps offering host community compensation – a form of equity adjustment aimed at correcting imbalances between local burdens associated with potential projects – would address this.

A literature review showed that with compensation, there was a substantial increase in the acceptance of low risk facilities, but it made little difference in the case of high risk projects (could be useful when planning low to medium risk projects with increased safety measures). Several recommendations were made including more research into WHY compensation is effective (or not) and efforts should be made into increasing external validity (e.g. more onsite research, non-citizen examples etc.). Other factors should be considered, such as the timing of compensation, who is offering the compensation (trust issues) and citizen participation in host fee negotiation etc.

In conclusion, host community compensation is not a final solution for all problems, but it can help to prevent some facility siting issues. More research is needed on these principles to see the effect on public acceptance and research should be undertaken to confirm the potential of this compensation in the specific context of CCS.

*Frank van Rijnsoever, Universiteit Utrecht – Practical CCS communication*

The team have been looking at the influence of communication frames on the choice for or against CCS and on choice persistence for different population segments. Theoretical approaches include elaboration likelihood model, prospect theory, classification of arguments and random utility theory (RUT). RUT is widely used and looks at utility (the happiness experienced from making a decision) from choice attributes/individual characteristics that are observed plus those that are unobserved. Discrete choice experiments will be used for this research in CCS communication and are based on RUT, giving participants a series of choice tasks and allowing for generalisation and heterogeneity. The researchers will vary attributes through model source to message to receiver. The characteristics of the respondents will be looked at to ensure a representative and fair sample – including involvement with CCS, knowledge of CCS, attitude towards climate change, use of information sources and social demographics.

### Conclusions

The purpose of a social licence is to facilitate on-going acceptance from the local community and other stakeholders – trust plays a critical role in the relationship between contact and relational consequence. According to literature, host community compensation can help to prevent or solve facility siting issues. Research is needed to examine why and when such compensation works, also to confirm the potential of host community compensation in the specific context of CCS.

# Session 5: Influences to Evolving Energy Complexes

**John Cook, Global Change Institute – Website on climate denial/misinformation etc.**

Mr. Cook runs a website looking at misinformation and climate denial – and uses science to address these issues. He has demonstrated that the process of debunking myths can actually backfire, however – as when you try to debunk a myth it can actually reinforce the idea in people's minds – the 'Backfire Effect'. The key in this instance is to reinforce the facts or explicitly warn people before the myth. Even when these backfire effects have been negotiated past, there is still an issue to deal with – when a myth has been 'debunked', a gap is left in the persons mental model. It is important to fill this gap with an alternative explanation (so a gap is created by the facts, then filled by the alternative information).

It has been identified that to make ideas 'stick' in peoples' minds you must make them simple, concrete, unexpected, credible and emotional. The 'Curiosity Gap' refers to the generation of curiosity by opening gaps in a person's knowledge, then filling these gaps – the same process as the debunking method mentioned previously.

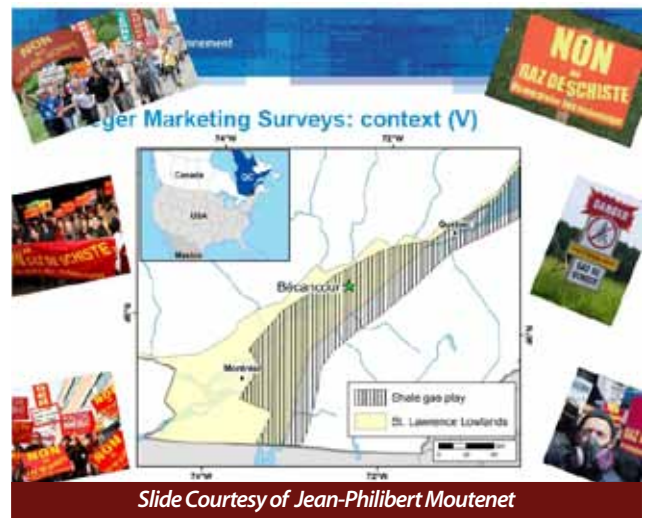
**Koen Straver, ECN – "Mapping the Dutch media landscape on CCS: Arguments and knowledge transfer"**

The purpose of media analysis is to monitor developments in public opinion and to relate with the knowledge of lay people, omissions in knowledge, misperceptions etc. A medialog analysis was carried out – of all national (Dutch) newspapers from May 2009 to October 2011 where the main article topic was CCS, and participants were given a short questionnaire about the article. They found that CCS was mainly discussed from a safety and political perspective, with focus on developments in policy, projects and stakeholder relations. Much less attention was paid to the context of climate change, energy use and the role of CO<sub>2</sub>. Little attention was given to CCS for its role in energy transition.

**Jean-Philibert Moutenet, INRS – "The evolution of public awareness and opinion on CCS in the context of shale gas exploration in the province of Québec (Canada)"**

There is currently a debate on going in Québec on shale gas exploration, which could have an impact on public/local opinion of CCS. It is important to look at such impacts and in this case Léger marketing surveys were used, with one year between each survey. Respondents had little awareness of climate change (what it is, the causes), knew almost nothing about CCS and had only a partial understanding of CO<sub>2</sub>. Respondents were given a short explanation of CCS during the survey.

The surveys found that it is not possible to link the increase of respondents against CCS and the increase in security concerns specifically to the shale gas debate that started after the first survey. Other influences (i.e. alleged leaks, political and economical conditions) could have had an effect on the opinions. CO<sub>2</sub> geological storage and shale gas activities share the same techniques and so a layperson could view them as similar activities. It was concluded that the social context in a region where controversial shale gas activities are underway may not be conducive for acceptance of a potential CCS pilot.



## Conclusions

Care is required when debunking myths/misinformation and backfire effects should be avoided to prevent reinforcing of the misinformation. The 'stickiness' of correct information should be improved by creating a gap in the understanding and then filling this gap with an alternative narrative. In Québec we saw that significant results suggest a rise in negative views of shale gas with reduced favourability to CCS – leading to interesting implications for the technology. The ECN study showed an overall balanced use of Dutch arguments, but there were more negative than positive arguments in the media (regarding issues such as safety, economy, environment and ethics) and the coverage of climate benefits was positive but infrequent. CCS was found to be mainly discussed from a safety and political perspective – much less attention was paid to the context of climate change, energy use, the role of CO<sub>2</sub> and implications for this role in energy transition.

# Session 6: Collaboration Opportunities

*Prof. John Cole, Australian Ctr Sustainable Business & Development "Bridging the parallel universe: making research matter in public policy"*

Climate change is an environmental issue that shifts quickly from the science to policy realm and can be seen as a human dilemma – covering many important issues including natural resources, social problems, the environment and economy.

Modern trends seem to be that science is confused with activism, risk communication becomes spin, it is now a matter of beliefs, where simplicity prevails, there is alienation from politics and there is a distrust of science. Science does not seem to be well represented in general programming and newspapers are in decline in the OECD countries but are growing in popularity in developing countries. A key issue is the fact that opinions change greatly due to external influences and lessons learnt from water (recycling projects) have shown us that policy must be 'simple, honest and grounded in reality'.

*Kirsty Anderson, Global CCS Institute – "Research priorities at the Global CCS Institute"*

The Global CCS Institute is interested in sharing knowledge, fact-based advocacy and assisting projects. In supporting social research, The Institute has a CSIRO-led global research programme, CCS project deliverables, international workshops/meetings, IEAGHG Social Research Network and over 45 social research reports. The Institute also provides toolkits and guides, project/area specific reports and have future priorities geared toward social research. Such priorities include targeted reports and cultural translation within Asia and developing countries.



## Conclusions

A key issue is how to bridge the gap when social science crosses into policy and industry and how to ensure social scientists are heard. More research is still needed, but it is important that previous work is used and applied. A 'knowledge broker' between the scientists and policy makers is a potential solution to ensure that messages are not confused during translation. It is key that communicators should look at their community first.

# Session 7: Outcomes and Recommendations

## Gaps

Gaps identified during the meeting included areas like energy literacy (expanding perception and knowledge) – here there is a need for broader education on energy including the global need and the broader energy mix, including CCS on gas power. There are gaps in social research in China and a lack of perception and social studies in other non-OECD countries. More needs to be done on the antecedence of trust and the application of lessons learned (i.e. in the translation of these lessons). Further research is needed into the engagement of local people by carrying out more research into site-specific social research. It is important to consider how to create a shared vision between actors in a multidisciplinary team (an example of how to do this may be a toolkit) and how to ensure heterogeneity for the development of communication materials. The uniqueness of CCS should be characterised and intergenerational justice should be considered.

## Conclusions

The perceptions of CCS are more powerful than knowledge, but knowledge does play a role in shaping attitudes – it is important to discuss CCS in the broader context of energy/climate change and also provide knowledge on the basics (i.e. properties of CO<sub>2</sub>). Key lessons learned are being used and, more importantly, applied – although more social science research is needed. Care should be taken when debunking myths and in particular to avoid misinformation. Host community compensation is not a final solution to siting issues but can be a valuable tool to help prevent (or solve) CCS facility siting issues and controversies. Social science research is similar to geological research on CO<sub>2</sub> storage (as it is site-specific) and more sites are needed to further develop understanding.

## Recommendations

The following recommendations were made at the end of the two day meeting in Australia:

- The exchange of information should be encouraged in new research projects
- More sites are needed to ensure detailed and accurate results
- Further multidisciplinary social research should be carried out, bringing other dimensions of social science together on key issues such as risk communication and community compensation
- More applied research is needed on sites with monitoring experience (to assess development of perceptions and attitudes)
- Energy literacy must be promoted
- A platform should be created to capture and share social science research – a potential new responsibility for IEAGHG.



## IEA Greenhouse Gas R&D Programme

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