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SUMMARY REPORT OF THE 2ND IEAGHG SOCIAL RESEARCH NETWORK MEETING

Report: 2011/12

November 2011

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established in 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme. The IEA fosters co-operation amongst its 28 member countries and the European Commission, and with the other countries, in order to increase energy security by improved efficiency of energy use, development of alternative energy sources and research, development and demonstration on matters of energy supply and use. This is achieved through a series of collaborative activities, organised under more than 40 Implementing Agreements. These agreements cover more than 200 individual items of research, development and demonstration. IEAGHG is one of these Implementing Agreements.

DISCLAIMER AND ACKNOWLEDGEMENTS

The 2nd international research network workshop on the Social Research Network was organised by IEAGHG in co-operation with JGC and Mizuho Information & Research Institute. The organisers acknowledge the financial support provided by Quintessa, Mizuho Information & Research Institute, GCCSI and JGC for this meeting and the hospitality provided by the hosts, JGC and Mizuho Information & Research Institute, at the Yokohama Royal Park Hotel.

A steering committee guides the direction of this network. The steering committee members for this network workshop were:

Peta Ashworth, CSIRO (Chair)
Tim Dixon, IEAGHG (Co-Chair)
Kenshi Itaoka, Mizuho Information & Research Institute (Host)
Dancker Daaman, Leiden University
Marjolein de Best-Waldhober, ECN
Sallie Greenberg, Illinois State Geological Survey
Minh Ha Duong, CIRED
David Reiner, University of Cambridge
Sarah Wade, AJW Inc.
Ameena Camps, IEAGHG

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The report should be cited in literature as follows:

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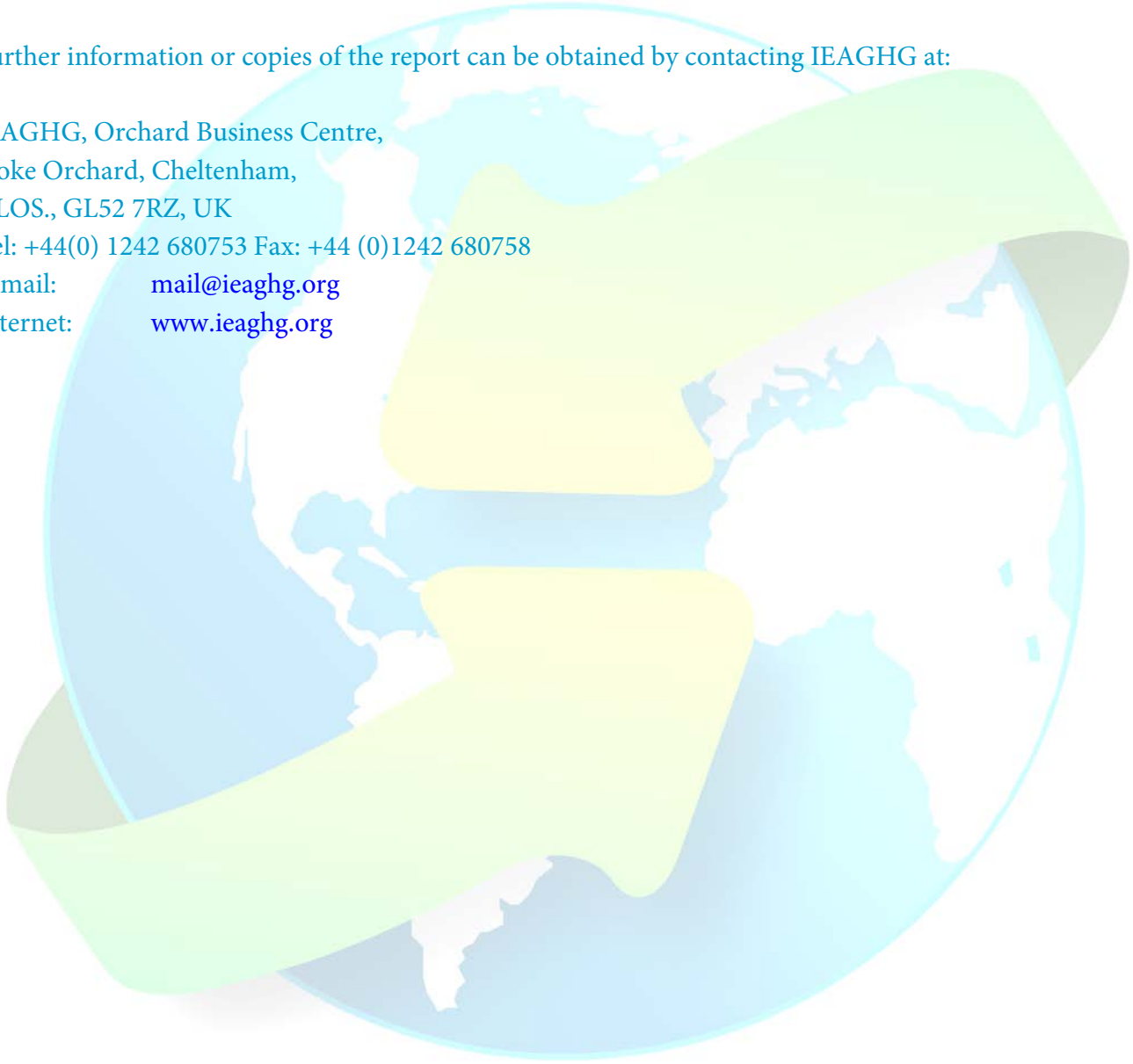

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EXECUTIVE SUMMARY

The 2nd IEAGHG Social Research Network Workshop was held from the 17th to the 18th of November 2011 in Yokohama, Japan hosted by JGC and Mizuho Information & Research Institute; sponsored by Quintessa, Mizuho Information & Research Institute, GCCSI and JGC. 42 participants attended the workshop from 8 different countries. The two day workshop discussed methodologies and techniques, working in contentious environments, social science CCS research in Japan, learnings from other energy technology research, use of social media, knowledge gaps which need to be addressed in future research and future aims of the IEAGHG Social Research Network (SRN).

Recurring findings from the workshop sessions were identified as:

- dig deeper: there is a need to understand theoretical underpinnings to perception;
- stay local: only then can you understand perception of specific projects;
- trust is very important in information provision, as is underlying attitudes;
- it is important to explore the extent to which social science is presented/discussed effectively in the media;
- there is a need to understand the socio-cultural context;
- there is a need to map the politics of CCS;
- all research methodologies are necessary and there is a need to expand methodologies used.

The key knowledge gaps were highlighted as: anchoring of CCS in pre-existing knowledge/cognitive networks/socially embedded; use of imagery in communication; tested standardised communication materials; understanding the role of information on changing opinions; further understanding of agendas within the research community and the psychology of decision makers; social site characterisation by indirect methods; a list of key terms and terminology definition; evidence base for social media and, in depth studies involving theology, history, linguistics, philosophy, ethics.

The participants of the 2nd Social Research Network Workshop recommend:

- the production of a list of key terms/terminology;
- further collaboration for Interdisciplinary Social Science research;
- expansion of the SRN community;
- greater inclusion of non-OECD countries and international comparative studies;
- mapping communication sciences and CCS politics;
- collation of greater evidence base e.g. to evaluate social media;
- the production of a special issue of a journal and,
- further dedicated discussion of ethics.

The agenda and presentations from the meeting are available in the Social Research Network members' area of the IEAGHG website (www.ieaghg.org).

Introduction

The 2nd IEAGHG Social Research Network Workshop was held from the 17th to the 18th of November in Yokohama, Japan hosted by JGC and Mizuho Information & Research Institute; sponsored by Quintessa, Mizuho Information & Research Institute, GCCSI and JGC. 42 participants attended the workshop from 8 different countries. The two day workshop discussed methodologies and techniques, working in contentious environments, social science CCS research in Japan, learnings from other energy technology research, use of social media, knowledge gaps which need to be addressed in future research and future aims of the IEAGHG Social Research Network (SRN).

The agenda and presentations from the meeting are available in the network members' area of the IEAGHG website (www.ieaghg.org). The previous workshop agenda, presentations and report are also detailed on this website.

Welcome Session

Chaired by Peta Ashworth, CSIRO; Tim Dixon, IEAGHG and Kenshi Itaoka, MIRI

Tim Dixon opened the meeting by welcoming all participants, thanking the hosts of the meeting and the sponsors; re-introducing the objectives of the Social Research Network:

"***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".***

Peta Ashworth, Chair of the Social Research Network International Steering Committee, introduced challenges facing the social science research community including: maintaining integrity of social science, working with a sense of urgency, and working in a field with differing agendas stressing the importance of being explicit when describing assumptions. Ashworth highlighted some of the key questions arising from the previous meeting. Peta was followed by introductions by Kenshi Itaoka of Mizuho Information & Research Institute (MIRI), Sei Tange, the vice president of JGC and Jun Hirosaki, Director of Natural Environmental Resources at Mizuho.

Following the welcome and introductions an interactive session with six groups took place to examine the questions:

- How far do you think we have come?
- Where do we want to go next?
- Who is not in the room?
- How do we want to continue to foster collaboration and networking: between the group, other social science researchers, across domains, and external bodies such as decision makers, industry etc.
- What would success look like for these two days?

Working group discussions raised a general consensus that the social research community has come a long way, as has its engagement with industry. Many participants felt the meeting was in itself an accomplishment. There was general consensus lessons have been learnt from cases such as Barendrecht and social issues are now high on the agenda; although most agreed there is still a long way to go. The community asked to encourage knowledge transfer between different audiences and build trust, to examine the difference between acceptability and acceptance; and raised the importance of understanding cultural context of competing agendas to understand differences and develop strategies for such. Understanding

methodologies across the world and developing methods sensitive to different agendas and cultures are also areas the community highlighted as important to explore. Risk communication and drawing a map of policies and politics of CCS was also seen as important. There was also some discussion around encouraging government/policy makers and NGOs to participate in the network.

Day 1: Methodologies and Techniques

Session 1: Methodologies and Techniques Part 1

Chaired by Sallie Greenberg, ISGS

1.1 Focus Group Discussions versus Information Choice Questionnaires

Dancker Daamen, Leiden University

Dancker introduced experimental research in which two methods to communicate CCS information to lay people are compared: focus group (FG) discussions and Information-Choice questionnaires (ICQ). The research was part of a FENCO-ERA* project, carried out in six countries: Romania, Greece, Germany, the UK, Norway and The Netherlands. Three indicators of opinion quality were used: consistency, stability and confidence/sense of conviction. Per country there were 60 people provided with identical information; 30 via focus groups with 10 participants in 3 focus groups, and 30 via information-choice questionnaires. Professional moderators presented identical information in the form of a script with a questionnaire at the end. Focus Group participants were perfectly matched on sex, education level etc. The information provided was on energy mix, global warming, CCS in general and on two specific CCS options. The variance in the overall opinions for both CCS options was predicted, both of which had 7 shared consequences (safety of transport, safety of storage, CO_2 leakage, reliability of energy supply, storage capacity in years, price, contribution to greenhouse effect), and the percentage variance of overall opinion were explained by evaluations of 'shared' consequences, measuring the stability of opinions over time, around 20 minutes later. The difference was large for FG participants over time, which pointed to opinions being more stable with ICQ. Three items were averaged into a mean confidence index, which was again higher in ICQ. Additional questions to explore how participants received the quality, and the perceived credibility of the expert in FG, which was on average high. This therefore helped demonstrate the difference between the two methods is not to do with knowledge or perception of the experts.

Dancker concluded CCS communication appears to be more effective via ICQ producing more consistent, more stable opinions which people are more confident about. If collecting informed opinions of a population ICQ would be recommended; but to promote dialogue and engagement of local stakeholders and acknowledge local concerns FG discussions are more appropriate.

1.2 What explains differences in change of initial perceptions of CO_2 Capture and Storage?

Diana Schumann, Forschungszentrum Jülich GmbH

This research was introduced by Diana as work in progress, with the presentation focusing on the approach, as opposed to the final results. Diana noted from survey work in Norway as part of the FENCO-ERA project in 2009, opinions of CCS appear unstable and systematically differ between Norway and Germany, but the reasons for this remains poorly understood. To understand such differences data was collected on two kinds of initial perceptions: regarding the use of CCS to address global warming (general idea of CCS), and regarding the permission of a CCS demo plant (concrete proposal of CCS). Both samples were surveyed

**FENCO-ERA is a co-ordination action supported by the European Commission to establish a European Research Area Network or ERA-NET for Clean Fossil Energy Technologies*

before and after receiving information about CCS and the differences between pre-information and post-information perceptions were calculated. The number who didn't change their perception was higher in Norway. The extreme change of opinion was higher in Germany. Perception is more negative before information is communicated in Germany. A number of questions were asked, and structural equation modelling was performed which includes statistical techniques such as path analysis, but most importantly it can model and test complex patterns of relationships. In the model it is possible to see the various variables including trust in information from government with various indicators. Two variables are important for the change in opinions: pre-existing knowledge and perception of risks. Preliminary results show knowledge as well as perception of personal risk can increase the stability of initial perceptions of CCS; however knowledge and risk perceptions are not correlated. Risk perceptions cannot be easily changed by increasing knowledge.

1.3 Discussion Session 1

The session was opened to the participants of the workshop to further discuss key outcomes of the presentations. Questions focussed on several areas including definition of a high quality opinion, and whether stability should be associated with quality. Some challenged the individualistic method of ICQ without relevance to media exposure and pressure groups in the external world and whether such a method is representative of society. There was also suggestion about conducting future research to investigate if decisions made in a group may be representative of development of opinions as well as opinion forming in a focus group without the trusting environment of friends and colleagues in comparison with a focus group conducted with friends. It was felt that consideration should also be given to measuring the multidimensional aspects of opinions including economic, social and political aspects as it was felt by some such multidimensional aspects may be the cause of uncertain views.

The importance of a larger population to base analysis of such results was also highlighted, with need for more people per country, as analysis of each indicator isn't possible without more data. Access, gathering and use of data was discussed, such as development of opinions as a result of the Barendrecht initial town hall meeting, the information kiosk, or following queries on the internet, where television was shown to be key for opinion development. A need for further research on regional communication differences was discussed, as was the use of internet focus groups as a potential more effective vehicle for reaching a sizable number of people and to ensure the provision of generalised consistent information.

Session 2: Methodologies and Techniques Part II

Chaired by Sarah Wade, AJW Inc.

2.1 NearCO_2 (Evolution of) Work Package 2: In-depth analysis of opinion shaping factors

David Reiner, University of Cambridge

David introduced his presentation by providing some background on Near CO2, which is funded by the European Union Framework 7, involving field work in The Netherlands, Germany, UK, Spain and Poland. The project has moved away from large scale opinion surveys and focus groups, to examine national and regional projects. It aims to sample regional public in the surrounding areas of the projects, using the same questionnaire for relevant stakeholders in the area. A geographic database has been developed as well as an online questionnaire to target key stakeholders in each region. The general public in each country will be targeted using dialogue boards as a qualitative analysis tool. The target

sample groups are 400 per country: 200 regional, 200 national, including journalists, politicians, local officials and NGOs.

The online questionnaire platform consists of a system survey which provides a sense of where they are in reference to the site. Another element is presentation of information, comparing textural information; looking at scale, participants will be told carbon dioxide will be stored underground, deep underground, or so many metres underground; altering whether visual support is provided and whether it is incongruent visual information or a distorted view to examine if incongruent information recipients would be more concerned. The questionnaire is currently being translated, and respondents recruited. Dialogue boards are to follow in December 2010, with analysis in early 2011. The final report will include the role of information and communication in shaping public understanding and attitudes towards CCS.

2.2 Public Acceptability of Technological Risks: Lessons from the Past
Joop van der Pligt, Universiteit van Amsterdam

Joop van der Pligt began by discussing risk perception stressing how risk denial can greatly influence public opinion, and the perceived type of outcome can be more important than its possibility. Characteristics of risk should not be ignored. Joop raised the consideration of moral issues in risk. He suggested the general conviction is that industry should carry the risk, because local people think it is unfair if they have to suffer for the common good. Joop highlighted the importance of trust to help garner support for a project with perceived risk. Normally, people trust local authorities more than regional, and regional more than national: hence the further the government is away from the individual the lower the level of trust. Therefore, the local government play an important role in siting problems.

Examining previous debates on risks, debates tended to focus on economic benefits, the environment and public health issues. They were seen to become more complicated with moral issues and economic costs which are also a consideration for CCS. Joop highlighted there are both similarities and differences between CCS and nuclear: similarities include the newness of the technology, disagreement between experts, local versus general and NIMBYism; differences include low general public involvement in CCS, generally knowledge is poor and there are probably more in CCS who have no opinion. He noted there is also a changing context as the role of the media has changed as they become keen to portray opposing views. At the same time changes in society mean it is more difficult to reach consensus, and general anxiety has increased. Joop recommended the importance of using a frame of reference for risk perception and consideration of the local perspective, ensuring if consensus is needed, early involvement of the public is necessary, if not essential.

2.3 Risk governance and CCS: methodological approaches for integrating experts, stakeholders and the public
Dirk Scheer, University of Stuttgart

Presenting developing methodologies based on the International Risk Governance Council's Risk Governance Framework, Dirk discussed a new agenda on how we can deal with risk. In the risk governance framework process for communication, there are four phases, including:

- pre-assessment - providing a broad picture of the risk;
- appraisal - the knowledge needed for judgements and decisions;
- characterisation and evaluation - ascertaining whether the risks are tolerable, acceptable or unacceptable, and;

- management - specifying who needs to do what and when. This is fed into the risk communication strategy from which a communication plan is developed.

The pre-assessment stage provides frames which determine boundaries, representing social, economic and cultural perspectives. Dirk highlighted in the public debate on CCS, there are three major frames, e.g. CCS as a bridging technology, CCS as a partial solution to climate change, and CCS as an excuse for rich countries and fossil fuel industries to resist change and transformation to a post carbon era. The appraisal stage performs the risk assessment; including hazard identification and exposure assessment; as well as the concern assessment identifying who is the risk taker and importantly risk perception, considering the type of conflicts e.g. cognitive or normative. The third step is risk evaluation and characterisation, based on the risk appraisal and evaluation of broader value-based choice and trade-offs, following a simple traffic light system; and fourthly is risk management, identifying the risk profile and characteristics of such. Dirk concluded by showing examples of application of integration methodologies including four projects which build on the level of involvement, from simple to complex to ambiguous such as the CCS Delphi study.

2.4 Discussion Session 2

In the discussion the Futuregen project was raised. In this case study stakeholders were seen to believe by being a part of the CCS project, and taking on the facility in the local area, they would be recognised by the wider world, as part of a 'cool club' and the area would be placed 'on the map'. This provides a different example for examining benefits and risks of CCS, that it is possible such a concept can be measured and reflected upon. However it was highlighted in examples such as Futuregen, there was a competitive process and a choice, and it may in fact be the choice context which creates the concept of a benefit. Similar cases were noted to be seen in tidal projects, though a project can equally be seen to stigmatise a community. Barendrecht was also noted as a case where the area was 'put on the map' and the NIMBY community were proud of being seen to protest. Community involvement in choice around projects going ahead was noted as essential in this process.

Discussion also highlighted the nuclear waste industry are now aware the voluntary approach is important, it is important to include more cognitive approaches to risk, with policy makers becoming more intuitive. Hence there have been some lessons learned and developments but there are not any ready-made solutions and as such there is no one approach. Additionally, there were several questions and detailed discussion on the use of unobtrusive surveys and whether the use of such could be avoided by strong survey design, framing questions effectively. This was left as something which is open to debate in future meetings.

Session 3: How to work in contentious environments

Chaired by Dancker Daaman, Leiden University

Panel Presentations from Peta Ashworth, CSIRO; Sarah Wade, AJW; Olaf Curry, University of Cambridge

Peta reflected upon her experience of a project in 2004, 2005 which aimed to establish a baseline of attitudes towards low emission energy technologies. The project received negative media attention because it was funded by the Australian Coal Association. Additionally, Peta reflected on the CSIRO stakeholder meeting in Paris which again received negative media attention. Peta then raised the questions of: what do we do? Should we respond? How do we balance competing agendas essentially being played out in the media?

The general response to these questions were social scientists have to be prepared for such situations when working in a controversial environment, and judgement has to be made depending on the instigator of the negative attention; hence if the instigator is widely respected a response may be necessary, however if not, the situation may be left alone.

Sarah presented the Carson study, based on the Carson project in California: a first of a kind hydrogen project capturing CO_2 and using this CO_2 for EOR. The project received criticism from some environmental justice groups. During research discussions, it became evident that some of the opposing groups/individuals would not participate in the research because they viewed participation as some kind of implicit support of the project which they opposed. Sarah raised the question: How do you justify research results if key stakeholder groups abstain from being interviewed? There are multi-dimensions to any aspect of social science research and there are often people who will not participate, so How do you address or explore complex interactions among social data, and How do we deal with missing information?

The discussion that followed focussed on how the information was delivered, whether lack of participation was interlinked with mistrust in the project itself, and the methodology used in the research study. This may not have been seen to be independent research by participants; therefore limiting participatory discussions. The complexity of the underlying aspects forming the manner of discourse in this process was seen to be evident, and discussions concluded such missing information is important to document because qualitative results may not always be possible and without documentation lessons may be lost.

Olaf presented his research project concerned with Climate Camp - an environmentalist/anti-capitalist movement. Olaf's project has an aim of asking Climate Camps participants to complete a questionnaire and to provide an opportunity for those at the camp to engage with an expert or person of authority on CCS. This was seen as a challenge for the researcher due to a clash of aims and objectives. It was difficult to enter a discourse both before and during the camps, because he was seen as a representative of coal. Olaf highlighted the main lessons learnt including: be open about funding and interests of the project; adapt modes of communication and behaviour in line with the participants, for example a questionnaire may have been too rigid; respect aims which may clash, and build relationships as a participation process is important acknowledging this is an active community; work to record existing data and build a dynamic discourse, have a more inductive process, and welcome opposition. Delegates added their own experience, re-iterating the importance of noting missing information, as completed surveys indicated Climate Camp participants trusted researchers undertaking the surveys; however this was biased as those who didn't trust didn't issue a response.

Discussion moved to that of building trust and maintaining an open discourse, noting the potential of hiring an external professional to conduct the research, so they can respond that they are hired specifically for this research and hence are not biased. However Olaf noted this would have been difficult for the example of Climate Camp as permission to attend was not sought beforehand. Importance of presenting both sides of the argument was also discussed to ensure trust of social scientists, though delegates highlighted this is difficult given misinformation in the media and a tendency to focus on conflicts.

Day 2: Applications and Outcomes

Session 4: CCS Social Science Research in Japan

Chaired by Marjolein de Best Waldhober, ECN

4.1 Towards Policy Integration: Developing the Integrated CCS Policy Framework and Assessing CCS Policy in Japan and Norway

Atsushi Ishii, Tohoku University

Policy integration importance to sustainable development and hence CCS was the focus of Atsushi's presentation. Atsushi discussed the development of a framework for both domestic and international policy, based on the Underdal 1980 framework which uses rational choice theory and a three step policy cycle – Comprehensiveness, Aggregation and Consistency; consistent with environmental policy integration (EPI), creating an integrated carbon capture and storage policy (ICCSP). Atsushi compared the status of policy integration in Norway and Japan, concluding the level of ICCSP is higher in Norway than in Japan.

4.2 Introduction of Japan CCS and Its Communication work

Yoshio Hirama, Japan CCS Company Ltd

Yoshio Hirama introduced Japan CCS Company Limited and its relationships with CCS activities in Japan. He outlined the interplay of institutes working in CCS research; highlighting Japan's government is currently conducting large scale CCS demonstration in Japan, the current status of which is under geological surveys by Japan CCS Co. Ltd in three candidate sites. The three survey sites are: Nakoso Iwaki, Fukushima Prefecture; Tomakomai, Hokkaido and, Kitakyushu in Fukuoka Prefecture, all which are currently under site characterisation stage, funded by The Ministry of Economy, Trade and Industry (METI). The potential project at Nakoso Iwaki is proposed to include IGCC and a depleted gas reservoir, whereas in Tomakomai and Kitakyushu the source would be from a large industrial complex, with storage into deep saline formations.

Prior to conducting field surveys for each site such as seismic surveys and/or survey wells, Japan CCS Co. Ltd held separate meetings with key stakeholders for each site. The purpose of these meetings were to provide specific information on each field survey, such as proposed duration, survey site, technical specifications, safety measures, as well as basic information regarding CCS, to each stakeholder group; with the main stakeholders being local governments, municipalities, local fisheries unions, local industries, and residents near the survey sites.

4.3 Focus group works in Japan

Kenshi Itaoka, Mizuho Information & Research Institute (MIRI)

The presented study aimed to clarify the role of focus groups in the practice of assessment of public opinion of CCS, in the context of national policy and of local CCS implementation. During focus groups, participants were asked about their awareness of mitigating global warming, including CCS. Information on CCS was provided including example projects, highlighting pros and cons. Comparing the two focus groups, there was no significant gap between the two, with general disagreement on CCS as a fundamental solution and concerns about human errors. The local group was in Tomakomai, and so they already knew CCS was being proposed in the area; however, in the national group participants questioned the potential localities in Japan and assumed it would be implemented alongside other mitigation strategies. The local focus group had already received significant information, therefore understood the importance of the geology in their area for siting, in comparison with the

national group expressing stronger concerns about siting in their area. Additional concerns raised included the short history of CCS as a technology, and though there were concerns about natural seismicity there was general understanding that natural seismicity had not caused previous natural gas leakage in Japan. Kenshi concluded qualitative assessments through focus groups and local meetings play an important role in understanding public opinion, and transparency of the project was noted as a key aspect in public engagement.

4.4 Discussion Session 3

Discussion largely focussed on the consultation process for the proposed Japanese CCS project, detailing the importance of allowing a significant period of time for the initial consultation. Participants also discussed rationalisation of a new technology through comparison with other technologies; which appears to be evident in the Japanese context, though other factors for rationalisation mean it is difficult to truly understand the process. The Nagoaka project was also highlighted as a referenceable project, though the main consultation for the project was with the local community and the municipal government; hence it is not widely recognised when communicating CCS.

Session 5: From Outside the Circle

Chaired by David Reiner, University of Cambridge

5.1 CCS Issue for Science/Technology and Public Policy: Lessons from Nuclear Waste and a Need for Technology Assessment

Dr Tatsujiro Suzuki, Vice-Chairman of Japan Atomic Energy Commission

Tatsujiro Suzuki presented nuclear and CCS in terms of energy needs and CO_2 reduction targets, displaying common issues for CCS and High Level Radioactive Waste (HLRW) disposal. Tatsujiro explained technically speaking, HLRW disposal and CCS can be conducted safely, but risks and social acceptability remains uncertain. These are long-term, with a low probability of leakage, but with a potential risk; which requires investment, implying irreversible risk. Both also may face NIMBY responses to projects.

As an example of HLRW disposal problems, in the U.S. the Radiactive Waste Act was passed in 1982 specifying the need for disposal. The Yucca mountain project was approved in 2002, and finally in 2009 the Obama Administration decided not to pursue the project. More than 10 billion US dollars has been invested, primarily for the depository at Yucca Mountain, and the US no longer knows how these funds are going to be used. In Japan there is currently no disposal site. In 2007, Toyocho (Kochi) applied for preliminary survey, but withdrew later due to public opposition, and in 2008 the Japan Atomic Energy Commission (JAEC) recommended a third party opinion on voluntary siting, conducting a public opinion poll in 2009 where 80% would accept HLRW disposal, but only 50% would agree to a site in their area. JAEC now recommends (from 2010) the introduction of a Technology Assessment as a new approach for engagement as an objective assessment of social implications of a technological development. A Technology Assessment (TA) is an interdisciplinary approach, assessing wider impacts of a technology on society, dealing with uncertainty and diversity of values, assisting social decision making; particularly in situations where there is lack of trust between society and technology. TA provides an objective description of facts, and evaluation framework for societal impacts, reduces uncertainty and assists constructive social decision making. In Japan this is now in its fourth plan.

The presentation concluded by recommending the use of Technology Assessment as a tool for constructive discussion. The following discussion highlighted risks of HLRW disposal and CCS are very different, and it is important to communicate such. Difficulties of

providing unbiased information was also discussed, and the specific issues of HLRW disposal as opposed to surface storage: surveys suggest the general public are frequently more favourable to surface storage, as monitoring is key for public assurance, as opposed to local communities surrounding such sites who would prefer long-term disposal.

Session 6: Social Science Research in the Larger Energy Context

Chaired by Kenshi Itaoka, MHIR

6.1 Tailoring CCS Communications to people's intuitive knowledge

Lasse Wallquist, ETH Zurich

Introducing the Swiss case, Lasse explained the Switzerland energy mix with 60% hydro and 40% nuclear, though older nuclear plants need to be replaced and gas fired plants (potentially with CCS) are being explored as an option. Switzerland is also a direct democracy with more than ten national public votes per year, and any large scale CCS project would be subject to a national vote. Explanatory information would need to be provided before such a vote hence highlighting importance of development of efficient communication materials. Lasse presented the research undertaken, starting with qualitative work consisting of 16 in depth interviews to identify concepts and initial attitudes of laypeople, followed by quantification with a survey based on stage one, to check for the prevalence of concepts, and finally, study three to examine if there is a cause or relation between perceived risks and benefits through experiments. Three experiments provided varying levels of information. Results concluded comprehensive information can reduce perceived risks and increase perceived benefits, but information on specific knowledge domains may play an ambiguous role; therefore it is important to distinguish between knowledge; information on protective measures does not lead to lower risk perception and higher acceptance, even though it can build trust and men's perception may be more susceptible.

6.2 Comparing opinion change after information about the Dutch energy context and seven mitigation options.

Marjolein de Best Waldhober, ECN

Following on from previous discussions on the ICQ, Marjolein introduced the ICQ as having an aim of not only providing respondents with necessary information to reach an informed opinion, but also to help them make use of this information to form opinions about different policy options. The policy problem presented in this study was: How can the Dutch demand for energy be fulfilled in 2030 in such a way that emissions of carbon dioxide will be reduced by 50%? - providing seven options for a 40 Mton reduction and presenting likely consequences for each technological option. There were over 900 participants. Results showed for nuclear energy most people do not change their opinion, biomass is more divided and with CCS and hydrogen energy opinions change significantly, with higher correlations if they have already heard about the technology except with biomass as when provided further information they changed their opinion. It was also shown people became slightly more positive when provided information on CCS although the correlations were extremely low.

6.3 Approaches for Informing Public Preferences for CCS and Other Low-Carbon Technologies.

Lauren Fleishman, Carnegie Mellon University

As public perceptions of CCS partly depends on their evaluation of other technologies, and there are numerous misconceptions about a range of low-carbon electricity technologies, Lauren presented research focussed on early eduction, as misconceptions can be resistant to change hence early education is important. Science teachers knowledge on common gaps

and misconceptions were tested, and teachers were provided with comprehensive knowledge and asked to rank technologies plus low-carbon portfolios. Findings show in this particular study science teachers had a low awareness of CCS, and those teachers who were more pro-environmental and with more support for climate change policy had greater technological misconceptions. Many science teachers may also hold an unrealistic view of the challenge of reaching a low-carbon energy future, with misconceptions and knowledge gaps potentially biasing rankings of nuclear, solar and wind. Similar results were obtained with the general public. It was noted there were limitations to the study including a limited portfolio of technologies, and a dynamic Excel form is currently being produced to allow potential future participants to build their own portfolio, showing least cost and most carbon neutral options. Following discussions highlighted the general public who participated in the study cannot be categorised as the general public, and are the educated public since over 60% had bachelor degrees.

6.4 Public engagement with renewable energy and electricity grid technologies
Patrick Devine-Wright, University of Exeter

Patrick discussed difficulties in understanding public response to projects, with wind energy technologies probably being the most mature and most controversial. Much of the literature is applied without attempting to understand the theory, e.g. driven by testing presumptions about the NIMBY concept which is critiqued as it leaves the cause of opposition unexplained: alternative approaches presume opposition arises from, for example, risk perception, procedural injustice or lack of trust. There are a narrow range of methods used and a number of knowledge gaps. Patrick presented new conceptual approaches to help understand public engagement with local technology proposals, developed from the 'Beyond NIMBYism' research, with a framework highlighting a bidirectional inclusive process.

The framework, not suitable for a toolkit or similar, begins with energy actors in networks (energy experts who build up a shared understanding) and, public actors in places (members of the public in particular places). When energy actors enter, they come with pre-conceived notions of what the public is and how they feel, but through interaction, they continuously learn more about expectations of the public, hence the engagement process itself. The public may also have preconceived notions. There are of course wider aspects which impact the engagement process, such as national policy, the history and culture of the local community. There is a challenge to capture attachment to place (an emotional bond with a certain location), to tap into meanings about the fit between the technology and place identity (role of places in constituting the self) with indicators of threat or opportunity, and shared meanings of the fit between a technology and the proposed place; hence understanding conceiving individual responses to be embedded in a dynamic, socio-political context. Patrick concluded with implications from case studies, quoting McLachlan, 2009: Engagement activities that "*do not attempt to understand how the place and technology are seen by stakeholders may fail to grasp why support and opposition positions exist and run the risk of exacerbating negative symbolic interpretations*" and highlighting the importance of narratives of technology 'emplacement' drawing from local distinctiveness and continuity.

6.5 Discussion Session 4

The discussion focussed upon Patrick Devine-Wright's presentation, discussing potential selection bias; highlighting the importance of understanding public support as well as public opposition, difficulties in scaling up the discussed framework to help understand national decision making given it is already oversimplified at the local level; and the importance of trust in information provision. Use of information in forming opinions was also discussed

and the complications of researching such as many attitudes may be behind the information people receive and using such underlying attitudes people search for and select the information/ type of information they desire.

Session 7: Application to the real world through the use of media

Chaired by Peta Ashworth, CSIRO

Panel Presentations from Suzanne Brunsting, ECN; Gretchen Hund, PNNL; Angus Henderson, GCCSI

Suzanne presented and reflected on her experience with social media, explaining there are various forms such as Facebook and blogs which are mainly used by people under the age of twenty five to use with their peers, not to meet new people. What is read or posted is not usually representative of the general population, those using social media are in general highly educated, and it is mainly used for maintaining contact with friends, rarely for political or social issues. Suzanne concluded responses in online media reflect extreme opinions of a small group of people. CCS impact in social media on the general impact is low, ad hoc interference with online communities is unnecessary and many of us are unprepared to use social media therefore any interference will most likely be counterproductive. Discussion also highlighted CCS isn't at a stage when people would engage with it, and as social media is generally used for entertainment purposes the subject area needs to be engaging to spark discussion.

Discussing media in general and the tracked media coverage of Futuregen, Gretchen asked how such media tracking can be used efficiently, and raised the importance of watching blogs to remain updated on project opinions. Television was also seen to be important as many people have been noted to gain their information from television. Discussion also noted there are companies which have active blog monitoring with direct response to provide information should it be required; though social media again is not used for information gathering hence, is not necessarily a useful media to provide information on CCS.

Angus presented new digital knowledge platforms being developed by GCCSI, where communities can upload documents etc using more of a social media approach, and asked questions which were raised during the production of such: how do we encourage people to collaborate through online discussions, and how do we (or should we) mediate conflicting opinions that may affect the broader debate? Discussion noted people will only collaborate if it is of interest to them; communication should be in multiple languages; it is difficult to build a community which needs time, nurturing and shouldn't undermine the importance of face-to-face interaction, and the use of online media presents a potential problem of creating divides given the number of people, particularly in non-OECD countries who are unable to access the internet.

Session 8: Outcomes and Recommendations

Chaired by Peta Ashworth, CSIRO and Tim Dixon, IEAGHG

The participants were divided into groups to discuss future important areas for social science research in CCS including:

- Foundations: mapping the social science of CCS and new/newly applied research methods;
- Process Topics: principles, terminology, ethics, coordination and collaboration; and
- Research Questions: local vs national perceptions, community benefits and the role of social media.

Each group presented their key discussion points to the other participants and session chairs noted key findings. Olaf Curry also presented his perspective on how to map the social science of CCS to discuss with participants.

The final meeting presentation (available on the IEAGHG Social Research Network members' website) details the key messages from each of the sessions. Drawing from these key messages, the recurring findings from all of the workshop sessions were identified as:

- ***Dig deeper: there is a need to understand theoretical underpinnings to perception***
- ***Stay local: only then can you understand perception of specific projects***
- ***Trust is very important in information provision, as is underlying attitudes***
- ***It is important to explore the extent to which social science is presented/discussed effectively in the media***
- ***There is a need to understand the socio-cultural context***
- ***There is a need to map the politics of CCS***
- ***All methodologies are necessary, and there is a need to expand methodologies used.***

The key knowledge gaps were highlighted as:

- ***Anchoring of CCS in pre-existing knowledge/cognitive networks/socially embedded.***
- ***Use of imagery in communication***
- ***Tested standardised communication materials***
- ***Understanding the role of information on changing opinions***
- ***Further understanding of agendas within the research community and psychology of decision makers***
- ***Social site characterisation by indirect methods***
- ***List of key terms and terminology definition***
- ***Evidence base for social media***
- ***In depth studies involving theology, history, linguistics, philosophy, ethics.***

Finally, the important recommendations from all the participants of the 2nd Social Research Network Workshop:

- ***Produce a list of key terms/terminology***
- ***Collaborate for Interdisciplinary Social Science research***
- ***Expand the SRN community, and invite decision makers, engineers, policy makers***
- ***Greater inclusion of non-OECD countries, and international comparative studies.***
- ***Map communication sciences, and CCS politics.***
- ***Collation of greater evidence base e.g. to evaluate social media***
- ***Produce special issue of a journal***
- ***Dedicated discussion of ethics***

IEAGHG 2nd Social Research Network Meeting

Yokohama City, Japan

17th – 18th November 2010

Yokohama Royal Park Hotel
2-2-1-3 Minato Mirai,
Nishi-Ku,
Yokohama, 220-8173

An IEAGHG meeting, hosted by JGC and Mizuho Information & Research Institute

Sponsored by:

Quintessa

Tuesday 16th November 2010

18.30	Evening Reception Trattoria Cortile, 2nd Floor, Queens Tower A, 2-3-1 Minatomirai, Nishi-ku, Yokohama

Wednesday 17th November 2010

Day 1 – Methodologies and Techniques

08.40 - 09.00	Registration
	Welcome to the IEAGHG Social Research Network Meeting
09.00 – 09.10	Welcome from *Tim Dixon, IEAGHG*
09.10 – 09.20	Welcome from *Peta Ashworth, CSIRO*
09.20 - 09.30	Welcome from *Mr. Jun Hirosaki, Mizuho Information & Research Institute (MHIR)*
09.30 – 09.40	Welcome from *Mr. Sei Tange, JGC*
09.40 – 10.10	Objectives for the meeting – what do we want to achieve? *Peta Ashworth, Kenshi Itaoka and Tim Dixon*
10.10 – 10.40	Coffee Break
Session 1:	**Methodologies and Techniques Part 1** Chair – Sallie Greenberg, Illinois State Geological Survey
10.40 – 11.00	Comparison of ICQ vs. Focus Groups, *Dancker Daamen or Bart Terwel, Leiden University*
11.00 – 11.20	ICQ vs. Focus Groups Extension, USA, Japan, Australia, *Gabrielle Wong-Parodi, University of California, Berkeley*
11.20 – 11.40	Structural equation modelling analysis of data from representative surveys regarding public perceptions of CCS in Germany and Norway, *Diana Schumann, Forshungszentrum Jülich*
11.40 – 12.30	Discussion
12.30 – 13.30	Lunch
13.30 – 14.00	Poster Session
Session 2:	**Methodologies and Techniques Part 2** Chair – Sarah Wade, AJW
14.00 – 14.20	NearCO_2 (Regional/local siting plus national surveys), *David Reiner, University of Cambridge*
14.20 – 14.40	Unobtrusive survey, *Dancker Daamen or Bart Terwel, Leiden University*
14.40 – 15.00	Public acceptability of technological risks: Lessons from the past, *Joop van der Pligt, University of Amsterdam*
15.00 – 15.20	Risk governance and CCS: methodological approaches for integrating experts, stakeholders and the public, *Dirk Scheer, University of Stuttgart*
15.20 – 16.10	Discussion
16.10 – 16.30	Coffee Break
Session 3:	**How to work in contentious environments** Chair – Dancker Daamen, Leiden University
16.30 – 16.45	Panel presentations – *Peta Ashworth, CSIRO, Sarah Wade, AJW, Olaf Corry, University of Cambridge*
16.45 – 17.30	Discussion
17.30	Close Day 1
18.45 onwards	Evening Dinner; **Details on page 4**

Thursday 18th November 2010

Day 2 – Applications and Outcomes

Session 4:	CCS Social science research in Japan	Chair – Marjolein de Best Waldhober, ECN
09.00 – 09.20	Communication work in Japan, *Yoshio Hirama, Japan CCS Company Ltd*	
09.20 – 09.40	Towards Policy Integration: Developing the Integrated CCS Policy Framework and Assessing CCS Policy in Japan and Norway, *Atsushi Ishii, Tohoku University*	
09.40 – 10.00	Focus group work, *Kenshi Itaoka, Mizuho Information & Research Institute (MHIR)*	
10.00 – 10.40	Discussion	
10.40 – 11.00	Coffee Break	

Session 5:	From outside the circle	Chair – David Reiner, University of Cambridge
11.00 – 11.30	CCS Issue for Science/Technology and Public Policy: Lessons from Nuclear Waste and a Need for Technology Assessment *Dr Tastujiro Suzuki, Vice-Chairman of Japan Atomic Energy Commission*	
11.30 – 11.50	Coffee Break	

Session 6:	Social science research in the larger energy context	Chair – Kenshi Itaoka, MHIR
11.50 – 12.10	Tailoring CCS communications to people's intuitive knowledge, *Lasse Wallquist, ETH Zurich*	
12.10 – 12.30	Comparing opinion change after information about the Dutch energy context and seven mitigation options, *Marjolein de Best Waldhober, ECN*	
12.30 – 13.30	Lunch & Posters	
13.30 – 13.50	Approaches for Informing Public Preferences for CCS and Other Low-Carbon Technologies, *Lauren Fleishman, Carnegie Mellon University*	
13.50 – 14.10	Comparison with renewables, *Patrick Devine-Wright, University of Exeter*	
14.10 – 14.50	Discussion	
14.50 – 15.05	Coffee Break	

Session 7:	Application to the real world through the use of media	Chair – Peta Ashworth, CSIRO
15.05 – 15.20	Panel presentations – *Suzanna Brunsting, ECN, Gretchen Hund, PNNL , Angus Henderson , GCCSI*	
15.20 – 16.05	Discussion	
16.05 – 16.20	Coffee Break	

Session 8:	Key Outcomes	Chair – Tim Dixon & Peta Ashworth
16.20 – 17.20	Discussion: Outcomes and recommendations Panel: Session Chairs	
17.20 – 17.30	Closing comments	
17.30	Close Day 2	

Evening Dinner

We will have dinner on a traditional boat (please see www.hamashin.co.jp for more details), with a 2.5 hour cruise around Yokohama Bay. Japanese dishes such as Sushi and Tempura will be provided. The boat will leave a pier called "Pukari Sanbashi" near the hotel at 18:45.

Yakata Boat

Steering committee

Peta Ashworth, CSIRO (Chair)
Tim Dixon, IEAGHG (Co-Chair)
Kenshi Itaoka, Mizuho Information and Research Institute (Host)
Dancker Daamen, Leiden University
Marjolein de Best-Waldhober, ECN
Sallie Greenberg, Illinois State Geological Survey
Minh Ha Duong, CIRED
David Reiner, University of Cambridge
Sarah Wade, AJW Group
Ameena Camps, IEAGHG

The International Steering Committee also wish to acknowledge Samantha Neades and Laura Davis of IEAGHG for all their hard work during the organisation process of this workshop.

Attendee List

Toshihiko Miyagawa	GCCSI
Gabrielle Wong-Parodi	Lawrence Berkeley National Labratory
Lori Gauvreau	Schlumberger
Lasse Wallquist	ETH Zurich
Bart Terwell	Leiden Univeristy
Sallie Greenberg	Illinois State Geological Survey
Dirk Scheer	University of Stuttgart
Suzanna Brunsting	ECN
Atsuko Tanaka	AIST, Japan
Tsukasa Yoshimura	IEA Paris
Anna Carr	CSIRO
Peta Ashworth	CSIRO
Ameena Camps	IEAGHG
Tim Dixon	IEAGHG
Sarah Wade	AJW Inc.
David Reiner	University of Cambridge, UK
Marjolein de Best Waldhober	ECN
Kenshi Itaoka	Mizuho Information and Research Institute
Dancker Daamen	Leiden University
Lauren Fleishman	Carnegie Mellon University
Monica Lupion Cordero	CIUDEN
Gilles Mardon	CIRED, France
Ryo Kubo	Research Institute of Innovative Technology for the Earth (RITE)
Olaf Corry	University of Cambridge, UK
Someya Satoshi	AIST, Japan
Saito Aya	Mizuho Information and Research Institute
Makoto Akai	AIST, Japan
Diana Schumann	Forschungszentrum Julich GmbH
Joop van der Plight	University of Amsterdam
Atsushi Ishii	Tohoku University
Mia Paukovic	ECN
Patrick Devine-Wright	University of Exeter
Suguru Uemura	Tokyo Institute of Technology
Shuichiro Hirai	Tokyo Institute of Technology
Angus Henderson	GCCSI
Gretchen Hund	Pacific Northwest National Lab
Tatsujiro Suzuki	Japan Atomic Energy Commission
Sei Tange	JGC
Yoshio Hirama	Japan CCS
Chiaki Shinohara	Japan NUS Co., Ltd.