



ieaghg5thsocialresearch networkmeeting Monday 6th July 2015

'Energy Transformations and the Role Of Social Sciences'

An IEAGHG meeting, hosted by St Catharine's College,
the University of Cambridge, UK

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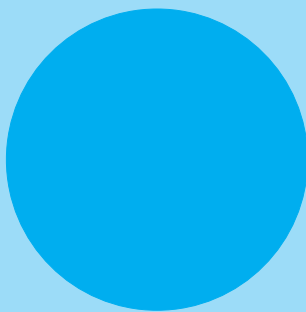
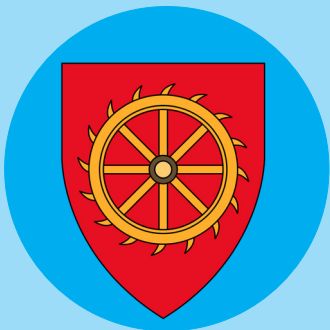
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St Catharine's College Crest / St Catharine's College by Night

Introduction

This 5th meeting of the IEAGHG Social Research Network (SRN) was held at St Catharine's College at the University of Cambridge in the UK, on Monday 6th July 2015. The meeting was hosted by the University and kindly supported by the UK CCS Research Centre. The theme of the meeting was 'Energy Transformations and the Role of Social Sciences' with over 28 delegates from 6 different countries attending the meeting.

The overall aim of the IEAGHG 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

It is worth noting that these objectives have been in place since its inception, however there has been no movement on creating the suggested clearing house of social science research, so it appears to be an aspirational objective rather than something that has been delivered on. Although it was recognised that much of this is now happens through online access portals such as ResearchGate.

Social Science Research and Energy Domain across UK and Europe

Chairs: Clair Gough & Sarah Mander

'Understanding the Role of Place Attachments and Identities in Explaining Public Responses to the Siting of Low Carbon Energy Technologies: implications for Policy and Practice', Patrick Devine-Wright, University of Exeter

This work looked into adopting a place-based approach to better understand responses of the public to the siting of projects involving low-carbon technologies. The research examined public reactions to an offshore wind farm, a power line proposal and a tidal energy project in the UK. Theorising the concept of 'place' has two aspects to it – a place as a locus of attachment/identity and a place as a centre of meaning. With the latter, these meanings are not fixed and people have different thoughts or feelings about them. 'Place attachment' describes the emotional bonds between people and particular environments (which can be attachment or non-attachment), where 'place

identity' refers to the ways in which places reflect and maintain identities for individuals or groups. This work argues the value of capturing place attachments and their related meanings to explain local responses to siting of infrastructure proposals, but notes that each in isolation is insufficient to explain why. It was felt that there is value in conducting and comparing multiple case studies across contexts and sectors to further examine the influence of place on consumers.

'Some Findings from Recent UK Public Opinion Surveys'; David Reiner, University of Cambridge

The EPRG (Energy Policy Research Group) recently conducted surveys examining the debate around energy including the rise of fracking and the stagnation of CCS in the UK. Results (see Figure 1) show that climate change is thought of as one of the most 'single important problems facing the world as a whole' (behind poverty and hunger). It was interesting to note that the UK public opinion polls on fracking were very similar to the US data but that the US system has allowed a vast amount of fracking to take place – where shale gas makes a small contribution in the UK – despite the tepid levels of public support. The reasons for this may include that in the US, landowners are able to receive compensation for the use of their land – whereas current compensation in the UK is essentially zero. The Crown Estate owns the mineral rights in the UK, so landowners would not benefit from the exploitation of resources on their property – so the public are less interested and involved because they are not gaining anything.

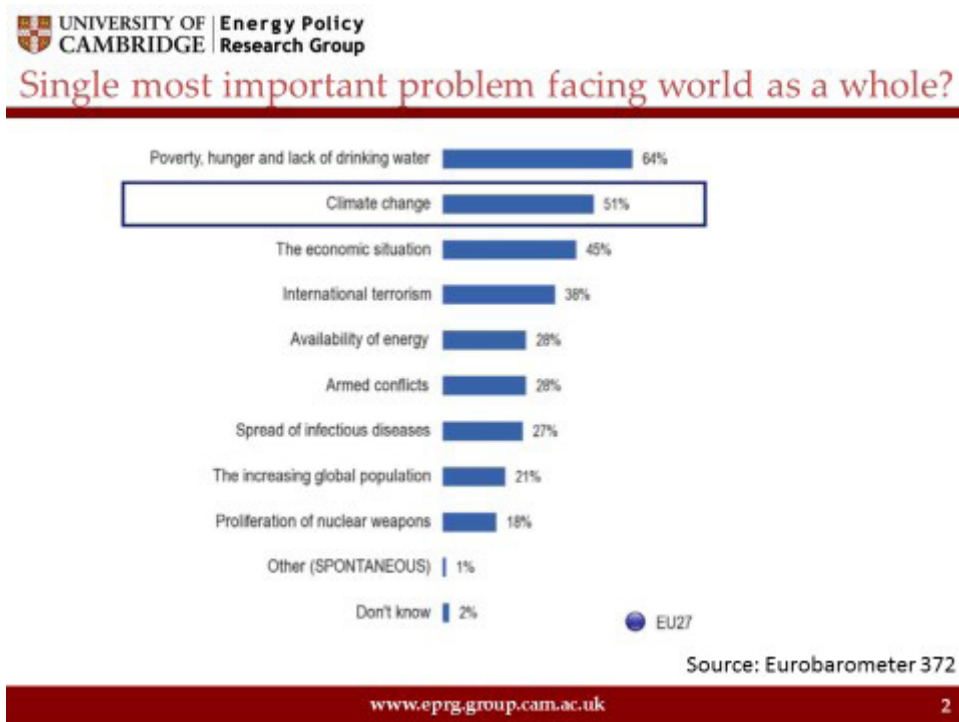


Figure 1 Data Showing Participants Thoughts on Key World Problems

'Social Science Research on the German Energy Transition: the Research Program ENERGY-TRANS as an Example'; Jens Schippl, KIT, Helmholtz Alliance

The Energiewende (ENERGY- TRANS) is the transition by Germany to an energy portfolio dominated by renewables, sustainable development and energy efficiency. ENERGY-TRANS focusses on the societal and technical requirements and the associate implications of such a transition, and will run until 2016. The group has analysed local conflicts and carried out opinion surveys to realise that in general, attitudes toward the energy transition were on the whole positive. This research programme identifies redundancies, inefficiencies and conflicting goals at and

between levels of the energy supply chain. It was observed that inconsistent alignment between representing parties or schools of action can lead to higher costs, excess infrastructure development and the weakening of public acceptance. Federal intervention must be balanced with decentralised activity and it has been found that there is a need for negotiation, transparency and independent monitoring.

The programme re-established the need for the socio-technical perspective and understands the importance that the socio- part cannot be ignored in the scientific and political arenas. It is a challenge to integrate the different strands of research, but an important aspect to consider for interdisciplinary research on socio-technical transitions.

'Framing Effects in the Communication about CCS: an International Experiment', Gerdien de Vries, Delft University
CCS is framed differently by different groups. Voluntary participants (all students) took part in an online framing experiment where they read an introduction to CCS before being given a short statement by a fictional stakeholder – there were 24 such statements, each from the same stakeholder and participants were allocated one of these 24 statements. Their attitudes toward CCS were then questioned. It was interesting to see that the results were slightly more positive, but even more so that where higher risk was emphasised (rather than safety), there was more support – a strange outcome. However, the Gerdien has hypothesised that perhaps when high risks are communicated, people may find the concept more plausible, more transparent – therefore creating more trust. On the other hand, in the anti CCS group, the high risk factors may not be emphasised as much, so people may be less likely to trust the stakeholder. It seemed that people who value power and achievement were more positive about CCS than those who did not. The sample size was relatively heterogeneous (around 800 useable participants), but it is interesting to see these indicative outcomes and this work provides input for further investigation into the role of equivalency framing.

Discussion

It seems that there has been some uptake and interest by policymakers and industry to work on place attachment, but a challenge has been to try to communicate the complexity of people's differing opinions/feelings where some may live close by, and be attached to the area, whereas others not so much. It was also recognised that the historic aspect can influence people's attitudes. It is also interesting to note that there is a presumption that the people who live beside a potential area of interest are a community – which is not always the case. In terms of 'NIMBYism' there is an emphasis on the costs and benefits that projects bring, and certainly in the UK, policymakers support the idea that local people need to benefit more. The recognition that compensation is needed is positive and welcomed, but has not actually been implemented so far.

It was observed that there was lots going on in terms of fracking and communication, but not so much for CCS – some parties within this Network are looking into why fracking has captured the imagination, but CCS has not – with some recognition that this has probably been influenced by the role of the media. It was thought that the association with fossil fuels is a problem; there is a general unhappiness with the perpetuation of the fossil fuel economy and there has been a concerted effort on the part of the grassroots movements that has started with some protest groups (for example the 'Frack-Off' group in the UK) – the tools that these groups have to alarm and concern the public are very effective, particularly in the US. It was recognised that such public opinions and feelings are site-specific, for example in Germany, CCS has now completely stopped because of public opinion, but the position of fracking remains the same. It was suggested that how sites are located could be important; for example, in Australia and the USA, there is more space so things like pipelines are in big open spaces whereas in Europe, it's more likely that most populations will be closer to any activities, but this concept has not been investigated much in the research. It was noted that the presumption from policymakers is that if it's far away (for example offshore), there won't be a problem – which is not necessarily correct. It could be that CCS goes ahead successfully in some areas of the world, but not all. In Alberta, Canada, there are lots of pipelines and wells, so the

addition of CCS infrastructure may not be too different to the norm. However, when you're trying to locate 3000 CO₂ injection sites, it could get complicated.

The discussion turned to procedural aspects and the process of engagement itself. It was recognised that it can be challenging to get people to actually engage with communicators, even when the opportunities are plentiful. It was agreed that it was underestimated just how complicated this is and can depend on a number of factors (such as the different technologies, sites etc.). All approaches are different, but perhaps a step in the right direction would be to develop some guidelines and try to raise awareness.

Research Findings from the Asia Pacific Region

Chair: Emma ter Mors

'Focus Groups and Interviews with Stakeholders of the Tomakomai Project before the Decision on the Project Site', Kenshi Itaoka, I2CNER

The objective of this work was to help understand how social characteristics of a potential CCS project site can influence the public understanding – and therefore acceptance – of the project. The interviews and focus groups were undertaken on the local community close to the Tomakomai CCS project in southern Hokkaido, Japan, and were conducted before the site selection was completed. Some emergent themes included the feeling of 'why here?', the perception of benefit and risk, experience as an industrial city with a mining industry (and the experience of disasters), and desirable communication. Stakeholders, NGOs and community leaders showed no strong opinions about Tomakomai being a candidate for a CCS project, a vague perception of the risks involved with CCS and the tendency to be neutral or positive to such projects was a common theme. The local community seemed interested in the project and there was some familiarity with the local mining activities which probably made people less concerned about CCS.

'Landscape of Opportunity, Landscape of Risk, or Both? Governing the Public and Stakeholder Dimensions of the Tomakomai CCS project', Leslie Mabon, Robert Gordon University

These interviews were conducted as part of a wider study into energy and risk in the Japanese marine environment and were held more recently, in the summer of 2014, with project managers and local officials in the Tokyo and Tomakomai areas. A mini ethnographic study was also carried out in the Tomakomai area, through informal conversations with locals, observing participants in their environment and simply viewing the area and its community. This research showed that there was an inequality between the ways that sites are decided (for example who deems that a community is a suitable site, and how), and brought up some reflections on potential sites for CCS projects, including the importance of transparency. There is a need for responsible governance, for example managing expectations and responses to stakeholder concerns.

'Turning Decide Announce Defend on its head: The role of volunteering in radioactive waste management site selection in Australia', Peta Ashworth, University of Queensland / Ash Research

Australia currently has stocks of low and intermediate level waste arising from the beneficial uses of radioactive materials in medicine, research and industry and a responsibility to properly manage the waste created. An independent panel (IAP) was formed to provide the Department of Industry and Science with a broader understanding of the issues associated with disposing and storing such waste in Australia. An opportunity has been extended to all landowners (in all states/territories) with tenure to potentially nominate their land to host such a facility. The landowner would then receive benefits for the use of their land, including being paid up to 4 times

the value of their land. The Department has received an encouraging response from landowners and the next stage will be to undertake a multi-criteria site assessment (on all nominations) received to determine which sites are appropriate for short-listing.

This idea of competition also arose in the FutureGen 1.0 project when comparing across CCS projects when it created a situation where the competing communities became invested in winning. It was suggested from that research that 'future project developers might consider adding the competition element and including public acceptance as an explicit criterion in evaluating sites'.

Discussion

What we know about CCS has not really been applied in the Asia-Pacific region and so some communities may not be used to having such questions asked. In terms of applying these questions in the local context, it is important to understand the local community. Local groups or ethnic groups could need different conceptualisations of place, for example, and will have different priorities, different issues, different perceptions of their 'rights' and therefore may need different approaches. It was observed that it is hard to compare CCS with other technologies, such as wind energy etc., because it is a more challenging technology. The economic effect is important and must be considered, as must the role of the media and their influence in various groups.

Specifically referring to the work with radioactive waste management in Australia, it was noted that this was rather specific to the area, particularly as the focus seems to be with the local community living in the area and whether they will agree or disagree to hosting the site. It is important to remember that the people interested in such technologies, such as fracking, is not limited to the local residents. The importance is for stakeholders – industry, policymakers, regulators and the public – to work together in the way most appropriate for the projects and themselves and to consider how we define the 'community' and care needs to be taken with such a definition.

Risk, Perceptions of CCS and Other Energy Technologies

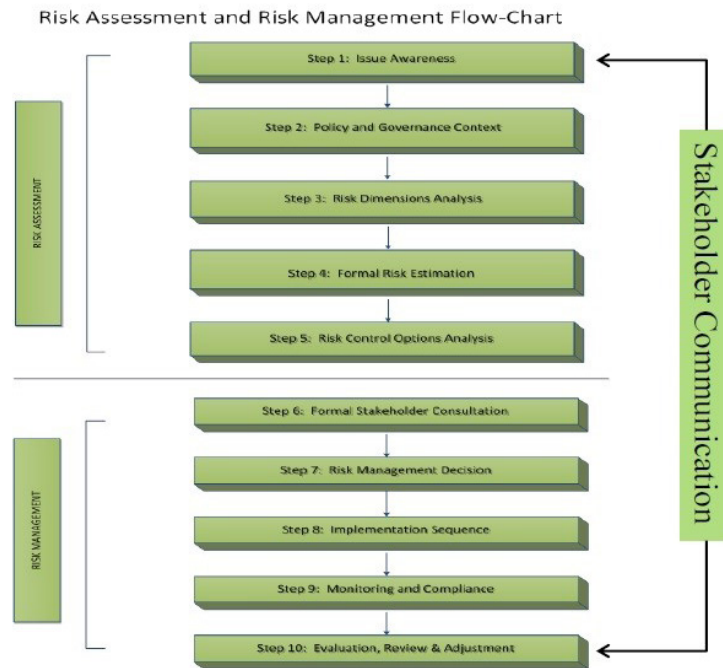
Chair: Kenshi Itaoka

'Development of an integrated Risk Management Framework for CCS in the Canadian Context', Patricia Larkin, University of Ottawa

There are many frameworks for CCS risk management (Figure 2 (Pg 6) gives an example of such a framework) with the focus of standard elaborated frameworks primarily on injection and storage, with many documents addressing storage site selection and characterisation. Few of these frameworks link with an assessment of emissions, waste or water use and uncertainty, while stakeholder communication and transparency are only discussed sparsely in the regulatory context and frequently in non-regulatory documents.

There have been previous attempts in developing an integrated risk management framework in CCS – see Figure 3 (Pg 6). Using structured expert elicitation (an international expert panel was convened to discuss risks and attendant uncertainties) to contribute to the framework development. This has been shown to be of value when data availability is lacking, as the understanding of relative risk and quantification of collective uncertainty judgments has improved when looking at injection/storage and the risk management of high impact, low probability events. Risk-based decision making needs to look at risk management, economic analysis, socio-political considerations and risk perception in the future to be successful. This integrated risk framework does include possibilities for practical application. At the population health level, it will encourage wide spread implementation of CCS as a global climate change mitigation option, and at local level it will ensure a blueprint for safe and effective implementation of the technology and wider public acceptance.

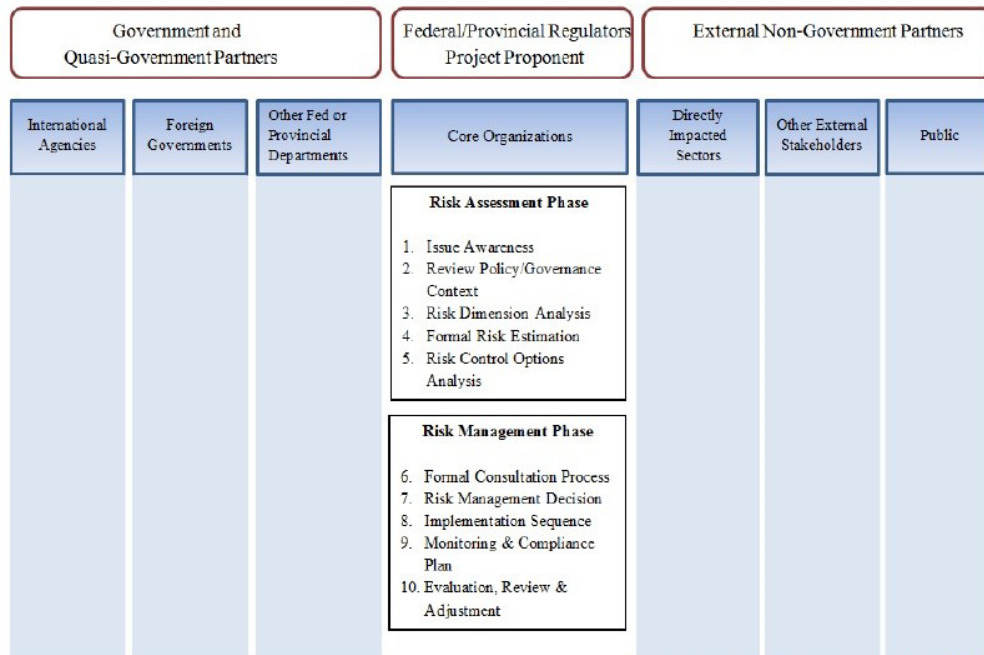
Generic Risk Management Framework



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Figure 2, An Example of Generic Risk Management Framework

Integrated Risk Management Framework



Adapted from Leiss et al. (2010)

Figure 3, An Example of an Integrated Risk Management Framework

'In Silico Science for Climate Policy: How Policy-Makers Process and use Carbon Storage Simulation Data', Dirk Scheer, DIALOGIK, Stuttgart

The main objective of this project was the systematic assessment of processing simulation knowledge within policy making. Using a case study approach, this work undertook a simulation in the area of CCS (a geological impact assessment) and carried out a conceptual and empirical analysis to look into how policymakers/stakeholders process (and use) policy-relevant scientific simulation. They found that 'role experts' and 'knowledge experts' have different focusses, allowing them to have different perspectives. Knowledge experts focus on their geo-scientific and simulation-based expertise whereas role experts largely consider socially and institutionally mediated interests, worldviews and values when processing CCS simulations. In terms of decision making, it was observed that such geoscience simulations are prone to delegitimising strategies and there is a trend toward using simulations as an instrument for evidence.

'Public Perception of CCS and Shale Gas in Germany: Similarities and Differences', Diana Schumann, Forschungszentrum Juelich

There has been a recent effort in technology monitoring, which aimed to survey the awareness, knowledge and attitudes amongst the German public regarding technologies, instruments and impacts of energy systems transformation. The aim of this specific study was to compare public perception in Germany of two technologies – CCS and shale gas extraction. This work used comparison along several indicators (self-reported awareness, factual knowledge, risk perceptions, benefit perceptions and general attitudes) and investigation into which factors determine general attitudes, using descriptive statistical and regression analyses.

The study concluded that public awareness of energy technologies is closely related to the public debate – and media coverage – of the technologies. Knowledge about such technologies increases over time (especially with aspects that are reported in the media), but misconceptions also persist over time. The most important direct determinants of general attitudes to energy technologies are perceived risks and benefits. Such risks or benefits for the society seems to be more important for general attitudes, rather than the perceived personal risks/benefits.

E-TRACK – Facilitating Public Participation in Radioactive Waste Management, Gianluca Ferraro, JRC

The EU Energy – Transparency Centre of Knowledge (E-TRACK) is a knowledge centre that promotes public participation in energy policy implementation, as a reliable source of information and collects and disseminates related EU knowledge and experiences. The objectives of this initiative include to collect information, to connect actors and to share knowledge. In terms of radioactive waste management, E-TRACK have carried out a study to look into the lessons learnt about policy formation, policy design and the implementation process for radioactive waste management. This project contacted about 280 organisations involved in the management of radioactive waste (with a 55% response rate). The project recognised the need for more information, for better communications and the need for multi-layer dialogue. It also recognised the importance of resources and formal/informal forms of public participation. Information, communication and participation are likely to build trust or re-build trust where it has been lost. Annual open seminars are held regarding the role of public participation in RWM.

Discussion

This diverse session stimulated much discussion between delegates and a question arose regarding the public perception in Germany, and why perceived societal risks and benefits seem to be more important than personal risks/benefits. It was suggested that, because in the study presented by Diana Schumann there was no specific project in mind, perhaps participants behave at a broader level until they have a recognisable project that they can relate their personal issues and opinions to. It was also noted that different groups of people will class their personal space differently, which will in turn affect their decisions and opinions regarding personal or societal risks

and benefits – and it's important to look at whether people may trade-off in their decision making (people may be prepared to trade off on their livelihoods if it means their communities can survive). A recent focus group in Australia (in a rural area where the coal seam gas industry is well-known) showed extremely positive opinions to a proposed coal mine where the society considered some local benefit (there will be some personal gain as a result of this). It was also discussed whether individuals may give more 'desirable' answers to fit in more with their peers, which can create issues as it is not always truly representative. This demonstrates the importance of thinking about how people may answer surveys compared to how they actually take action in real life settings.

Some UK work has shown that people perceive fracking differently to shale gas, which can be a challenge, and terminology has been observed to really affect perceptions. Recognising the extent to which language and terminology may effect public perceptions is critical as there can be severe responses in some cases. The question is, to what extent is it important to bring these considerations in to your risk assessment – and when these risk assessments are made, do you question the public. Research suggests that public perception is more multi-faceted than an expert's perspective.

History, People and Energy Transformations

Chair: David Reiner

'Routes of Power: Energy and Modern America', Christopher Jones, Arizona State University

Christopher reported that the history of energy transitions in the American mid-Atlantic – America's fossil fuel heartland – from 1820 to 1930 was heavily shaped by the building of routes – or infrastructure – along which the energy (coal barges) could be shipped. He suggested that infrastructure is an underappreciated driver of energy transitions. Transport matters because there is an uneven geography of energy cost, where sunk costs drive demand and infrastructure therefore can create inequalities. Infrastructure can throw up technical challenges and high costs, but it does facilitate the expansion of energy flows. The creation of demand and expansion of infrastructure can be viewed as a positive feedback loop – energy resources are often found in rural areas and canals/pipelines etc. are expensive, so demand has to first be created and the owners of transport systems are then incentivised to be energy boosters because of the sunk costs. Consumers increase the demand over time and the subsequent expansion of transport networks lowers the price for the consumer, which in turn increases demand. Transport systems also allow people to benefit without suffering any negative effects – such as NIMBYism, the worry of any issue that could arise; they 'disassociate consumers from environmental harms'.

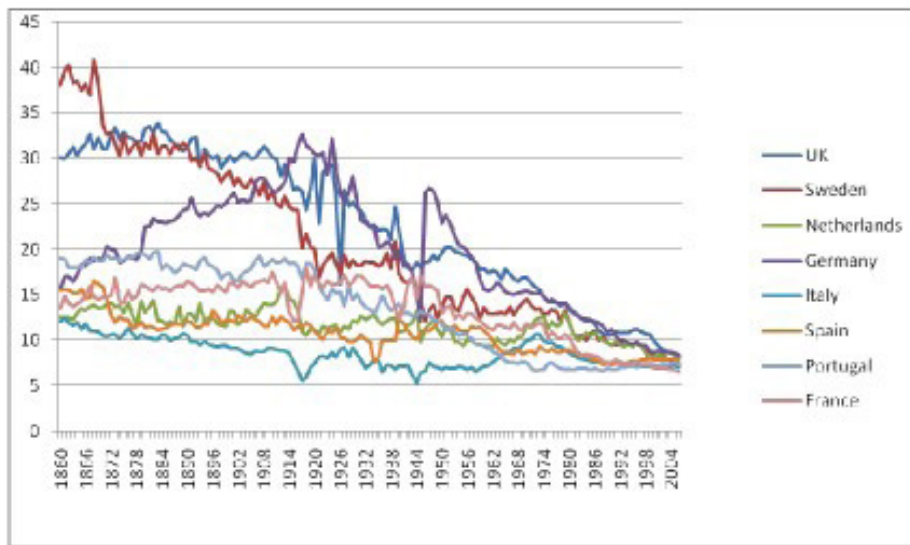
Transport and infrastructure can have significant amplifier impacts for a region. Canals allow multiple products to be transported in two directions to several places, with intermediate points along the route, whereas pipelines move a single product in a single direction, usually to a single place – a difference that leads to less amplifier effects. With canals, you see broad patterns of industrial development in many places (that benefit a number of people and spread economic activity) whereas with pipelines, their characteristics show much more concentrated effects.

Historical lessons can contribute to present learning, and demonstrate the importance of building infrastructure to stimulate renewable energy; the importance of recognising that demand is created over decades; and that infrastructure should be designed to minimise socio, technical and economical inequalities.

'Energy Transitions: a Long View', Paul Warde, University of Cambridge

This presentation gave an overarching analysis of the energy system in the UK and Europe from a historical aspect, an insight into the last 500 years and looking in detail at quantitative data to understand shifts in the system. The delegates of the SRN meeting were given an overview of total energy consumption in Europe, the consumption and primary energy use per capita, the convergence in energy intensity and the energy system of 20th century Britain and Europe (see Figure 4, below). A closer look was taken into the history of the UK's energy system and transition, looking at the long view of the UK, historical fuel prices and per capita energy use.

Convergence in energy intensity: Europe, 1860-2005



Data from Warde, Kander, Gales, Warde, Malanima, Henriques.

Figure 4, The Energy System of 20th Century Europe

The figure above shows the energy system of 20th century Europe; a period of time where Britain dominated the energy sector. There is a massive dominance of coal until after World War II, following which there was a visible expansion of oil and aggregate. Moving along the timeline, there is then divergence into other sources such as natural gas and primary electricity. Now, renewables are advancing quickly and the tapping into cheap stocks of fossil fuels makes more energy available. Following the 1970s where the oil crisis occurred, energy is now relatively expensive and there is more diversification of energy systems with a more conscious policy response being sought from the public.

Creating Value from CCS Research, Kevin Broecks, Utrecht University

Valorisation is the notion of 'producing value out of research' – which can be viewed from three perspectives: the value for society, value in university-industry interaction and the value in research programmes. This work wanted to look into why participation occurs, how collaboration can happen and the opportunities and barriers involved, and did so by analysing social networks, conducting semi-structured interviews and carrying out inductive analysis.

In terms of motives and resources, research programmes can increase the legitimacy of a particular research type, for example social research. Universities' motives/resources could include funding, insight into opportunities and community, and governments' motives/resources may include knowledge, the legitimacy of CCS and public

attending. Industry's motives/resources would be concerned with knowledge shopping, legitimacy research, insight into opportunities and contributions to strategy.

The main barriers observed included that there are often multiple disciplines involved and the connection of different perspectives, which can be challenging as many disciplines can throw up different perspectives. Knowledge dissemination was a challenge, and often falls to the social sciences for dissemination and coordination. The research suggests that it is key to learn how to align perspectives of different stakeholders and disciplines.

Discussion

There seems to be a common theme that working with such energy transitions needs careful attention as to what is actually happening; there are a number of actors that need to be aligned and a level of complexity is also often evident. Energy transitions in the past have been energy accretions – whereas now we're trying to reduce levels, even create new technologies to do so and use bigger infrastructure, where we have little experience and where there are significant obstacles and barriers. CCS, like nuclear and offshore wind power, comes in big chunks and is very expensive, making the potential of this learning challenging – more so than some other technologies, and a historical timeline such as those presented in this session is particularly relevant for a technology like CCS.

It is difficult to ascertain which kind of cost is best. There are many uncertainties; we don't know the future of gas, what's happening with climate change and we cannot predict the future of technologies and their learning curve – it was thought that projections can't be based on previous prices, for example, as the current energy situation is so different and therefore flexibility is an important factor. It was suggested that price does matter a lot, but when consumption and methods of getting energy are looked at, there are many long term fixed costs. The use of forecasts and predictions can often be incorrect – but they are crucial (and sometimes a legal requirement).

There is a need to acknowledge the spectrum of these projections being correct/incorrect; for example in 2009, CCS was predicted to be much more developed than it actually is. Many of the current predictions are backed by those who have the financial risk and investment behind them – perhaps demand is more predictable? The price of energy can explain (to some extent) the demand, but the scarcity of resources also makes a difference.

Looking at the work into the value in CCS research, it was wondered how much of this could be because of the engineers' view of the world – which they expect technologies and projects to take off and perhaps not necessarily account for the long time it takes to build a plant due to concerns, oppositions and permits etc. It was wondered to what extent more accurate projections would be realised by taking into account more sensitivities such as consumer behaviours, preferences, technical factors etc.. It was noted that if there was a 'hype', some researchers are more likely to spend their time and resources on it – which may lead to an increase in the technologies' progress.

Getting access to energy is a basic human right in the first world mind set, but there is nothing that reinforces that people do have this right. In the long term, choices and access to energy is a part of citizenship. In the short term, the range of energy options seems limited. Current energy practices are so unique, one can see a lot of contingency in where we are. Renewables may not be great for the energy system as they're not available to be used all the time – whereas the expectation is that electricity is now constant and consistent, which has taken a huge amount of effort from the electricity companies. Energy sources are needed to support the shifts in supply and demand.

Reflections, Outcomes & Recommendations

Chairs: Peta Ashworth & Samantha Neades

The 5th IEAGHG Social Research Network (SRN) meeting was another successful Network event, packed with interesting presentations on the latest outcomes in the field and full of thought-provoking discussions.

Delegates were provided an insight into social research in the UK, Europe and the Asia-Pacific region - a look into the perceptions of risk in the arena of low carbon technologies and the history of people and energy transformations.

Discussion in the final session examined the outcomes of the meeting, the value of the Social Research Network and the merit of the activity continuing. In summary, all meeting delegates (and therefore a large representation of the SRN members) were enthusiastic about the continuation of the Network and felt it was an important resource for all involved.

Similarly to previous SRN meetings, it was felt that a broader focus on the range of climate change mitigation technologies could be beneficial to increase the learnings in this area and raise awareness of findings. Collaboration with other disciplines would be beneficial for many reasons and could be of assistance when writing research papers – it was noted the inclusion of historians in this meeting had in some parts demonstrated the value of this. In addition to broadening the information dissemination, it may be useful to move the Network emphasis away from ‘public perceptions’ research to consider the wider CCS community – including stakeholders, practitioners, academics etc.

The dissemination of research from the Network outside the academic arena was also seen to be important and it was suggested that for future meetings, more focus should be placed on inviting speakers and researchers who would be able to talk on a wider – but relatable – areas of interest. This broadening may make it easier for policymakers to actually access the information emerging from this Network, and it was suggested that a quarterly summary of the Network activities – perhaps in the form of an IEAGHG Information Paper (IP)¹ – would be a very useful tool to assist with this dissemination. In addition to sharing outside of the social science area, it was deemed important that the Network stir future research and noted that the three potential new projects will provide opportunities for this – it was agreed by all that the lack of new demonstration and commercial projects of late is impacting social science research into public acceptance and engagement and CCS – industrial projects are crucial to aid learning and therefore progression. It is crucial to be always considering what knowledge gaps – and so research questions – need to be addressed in the realm of public engagement and over a portfolio of mitigation technologies.

It was felt that more on methodology would be advantageous or perhaps using more common methodologies and metrics across the CCS research network would be beneficial. It may be useful to look more into the implementation of strategies; how the research can be transferred for use in outreach and communication efforts. For example in cases of valid perception and acceptance, how can this data be turned into communication strategies and furthermore implemented?

¹ IEAGHG Information Papers (IPs): Free-to-access, short publications from IEAGHG on a variety of interesting topics, as part of a response to Members’ wish for timely reporting on current issues.

IPs from 2012 – present can be found at <http://ieaghg.org/publications/information-papers>

Recommendations

The following recommendations were made by attendees at the end of the fifth IEAGHG Social Research Network Meeting:

- Continue to broaden the Network's focus by inviting delegates from the general energy sector
- Broaden focus also by examining other low carbon technologies and related, applicable social science research across the whole realm of climate change technology – not just CCS
- Produce a quarterly summary of those in the Networks' current focus of research and disseminate as appropriate
- Encourage more research into the methodology of social science research in climate change
- Consider future research questions by trying to identify current knowledge gaps.

International Steering Committee

Peta Ashworth (Chair)

Samantha Neades, IEAGHG (Co-Chair)

David Reiner, University of Cambridge (Host)

Sarah Wade, Wade LLC

Sallie Greenberg, ISGS

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Clair Gough, Tyndall Centre for Climate Change Research, University of Manchester

Sarah Mander, The Tyndall Centre for Climate Change Research, University of Manchester

Emilie Brady, UK CCS Research Centre

Becky Kemp, IEAGHG

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Attendees

Peta Ashworth (University of Queensland)

Max Ball (Saskpower)

Emilie Brady (UKCCSRC)

Kevin Broecks (Copernicus Institute of Sustainable Development)

Rebecca Cunningham (Tyndall Centre for Climate Change Research)

Gerdien de Vries (Delft University of Technology)

Patrick Devine-Wright (University of Exeter)

Jessica Douglas (Global CCS Institute)

Gianluca Ferraro (European Commission)

Clair Gough (Tyndall Centre for Climate Change Research, University of Manchester)

Kenshi Itaoka (International Institute of Carbon Neutral Energy)

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Dirk Scheer (Dialogik gGmbH)

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