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# SiteChar

## Characterisation of European $CO_2$ storage

## Deliverable N° D8.2
## Trust building and raising public awareness

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| **Written By** | Suzanne Brunsting, Jessanne Mastop, Mariëtte Pol (ECN); Marta Kaiser, Rene Zimmer (UfU); Simon Shackley, Leslie Mabon, Rhys Howell (SCCS) | |
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# Content

# 1 Executive Summary

**Introduction**
At local level, public support has proven crucial to the implementation of $CO_2$ capture and storage (CCS) demonstration projects. Whereas no method exists to guarantee public acceptability of any project, a constructive stakeholder and community engagement process does increase the likelihood thereof.

This deliverable is a follow-up to deliverable D8.1 "Social site characterisation" (Brunsting et al, 2011a). Social site characterisation can be used as an instrument to explore, plan and evaluate a process of active and constructive local stakeholder and citizen engagement in a prospective CCS project as a parallel activity to technical site characterisation (Wade & Greenberg, 2009, 2011). It serves as an analytical tool to describe the local social circumstances in the area and to design and evaluate stakeholder and community engagement efforts with the aims of building trust and raising public awareness.

Using results from the social site characterisation of the area, the present deliverable focuses on the second purpose. It presents results from public engagement activities designed to raise public awareness and inform public opinion of a prospective CCS site in Poland (onshore) and the UK (offshore): focus conferences. Furthermore, by initiating an enhanced cooperation in planning of new storage sites between project developers, authorities and the local public, focus conferences aim to serve as a "hinge" between social site characterisation as a research effort and application to real-life project settings. The focus conferences are part of a range of public engagement activities including the setup of public information websites on generic and site-specific CCS, information meetings. A second survey eventually shall evaluate the results of the public engagement activities.

**Research overview**
The aim of the focus conferences was to raise public awareness and assist public opinion forming processes of a prospective CCS site in Poland (onshore) and the UK (offshore). At the same time, it aimed to present and test a format in which project developers, authorities, and the local public could enhance their cooperation in project planning. To this end, a group of 11-16 participants recruited from the local public gathered on two weekends to be informed about CCS technology, to discuss their perceptions of the rewards and risks of CCS technology, and to state their conditions for a socially acceptable implementation of CCS projects. Experts from research, politics, industry and NGOs were invited to participate in both weekends, during which they gave presentations and answered questions from the participants. This process resulted in a positioning paper written by the participants representing a statement on CCS technology from their perspective.

**Results**
Here we summarize the key messages from the focus conference participants to illustrate and integrate some points we have seen before and we feel are important to highlight to the reader. However, readers who take interest in these points are strongly encouraged to read the citizens' own wording of the issues, which are more elaborate than our repetition thereof. The positioning papers can be found in paragraph 3.7 (Polish participants) and in 4.7 (Scottish participants).

In Scotland, the participants' most important condition seemed to be that if CCS is at all worth pursuing, it should only be developed as part of a suite of options to combat climate change. More specifically, most of them think that CCS should be developed on a parallel track with renewable

energies. In Poland, the majority of the participants agreed that there are too many open questions regarding risks, benefits to the region, costs, and the position of the government. In all, the Polish participants think that at present CCS is generally too costly to invest in and that locally there are too many uncertainties to justify a project that lacks a clear local benefit.

Key messages from both groups can be summarized as follows:
- Agreeing that climate change happens and that measures should be taken does not imply agreement on CCS as a suitable method to curb climate change
- Acceptability of CCS is related to other measures to combat climate change
- Pay attention to national and local advantages and disadvantages
- Pay attention to risks and uncertainties
- National and European governments should clarify their role/position
- Citizens expect public communication and participation activities

Key recommendations from the authors for the use of focus conferences in projects are:
- Ensure trust in the facilitators and allow time to create a safe environment
- Embed focus conferences in a range of public engagement activities
- Do not extrapolate findings from small group research to communities
- Balance positions taken by speakers and in discussion materials

**Conclusions**

Focus conferences as public engagement activities can provide insight in the way local CCS plans will be perceived by the local public and enhance co-operation in planning of new storage sites between project developers, authorities and the local public. The research presented in this deliverable has resulted in first-hand accounts from Polish and Scottish citizens themselves on:
- Levels of awareness and knowledge of $CO_2$ and CCS
- Questions and concerns about CCS in context of other climate mitigation methods
- Expectations of CCS on (inter)national level
- Expectations of local CCS plans
- Conditions for implementation of CCS on (inter)national as well as local scale

The focus conference appears suitable for raising public awareness and to assist public opinion forming processes about complex issues such as CCS and to initiate local discussion and planning processes. Key to a constructive focus conference is trust in the independence of the facilitators. In a real life project, hiring independent facilitators would be recommended. These results inform further information provision and public engagement within as well as outside SiteChar.

Questions remain regarding the duration of the positive effects of focus conferences in citizen's attitudes and their applicability to a real project setting. Public engagement efforts are ultimately only effective if they make citizens feel listened to, involved, and empowered. In a real project setting, this can only be achieved if the citizens' suggestions are taken seriously and are truly taken into account in decisions regarding the project as well as in national policy agendas.

**Future activities**

The Polish positioning paper and its importance for the Polish climate strategy has been presented to the public, representatives of politics and research organizations during an information meeting on 25th June 2012 in Góra Śląska in Poland. A similar meeting will be held in the UK on 6th September 2012 at Elgin Town Hall in Scotland. Both meetings are followed by a survey to measure developments in local public awareness and opinion.

# 2 Introduction

This report describes results of public engagement activities for CCS at two sites: a CCS onshore site and a CCS offshore site. The onshore site is the Załęcze & Żuchlów site application (Poland - WP5) and the offshore site is the North Sea Moray Firth site (UK - WP3). The aim was to apply and evaluate public engagement activities that raise public awareness and to assist public opinion forming processes on CCS and initiate an enhanced co-operation in planning of new storage sites between project developers, authorities and the local public.

Aim of the SiteChar project is to facilitate the implementation of $CO_2$ storage in Europe by improving and extending standard site characterisation workflows to reach the final stage of licensing. Unique to the project is that besides a geological site characterisation, an assessment of risks, and the development of monitoring plans, the workflow also aims to include recommendations for social site characterisation as a parallel process to technical site characterisation as well as the application of public engagement activities in order to build trust, raise public awareness, and inform public opinion on CCS.

Social site characterisation is the process of repeatedly investigating public awareness and opinion of a CCS project, changes therein over time, and underlying factors shaping public opinion as a parallel activity to technical site characterisation (Wade & Greenberg, 2009, 2011). It serves as an analytical tool to describe the local social circumstances in the area and to design and evaluate stakeholder and community engagement efforts with the aims of building trust and raising public awareness.

The present deliverable describes results from WP8, task 8.2, for which focus conferences have been organized in March and April 2012 at two prospective $CO_2$ storage sites. The focus conferences, as well as the information meetings that will follow as part of task 8.3, act virtually as “hinge” between the analytical phase of the social site characterisation and a practical planning phase for CCS projects (Figure 1). This deliverable is a follow-up to D8.1 “Social site characterisation” (Brunsting et al, 2011a) which focused on the analytical phase of social site characterisation and consisted of (1) a description of relevant socio-economic and political characteristics of the sites; (2) interviews with relevant local stakeholders; (3) a media analysis of local newspapers; (4) surveys using representative samples to characterise the local population.


*Figure 1* *Social site characterisation, public engagement activities and participatory project planning and implementation as elements of socially balanced project development.*

This document is structured as follows. In the present chapter we will address the research background and method. Next, the results of the research will be described respectively for Poland (Chapter 3) and the UK (Chapter 4). Results will be discussed in Chapter 5 and implications will be addressed for further work within the SiteChar project as well as beyond.

## 2.1 Studying local perspectives on CCS: Why and how

At local level public support has proven crucial to the implementation of CCS demonstration projects, as recently demonstrated by the public's reaction to CCS projects in amongst others the Netherlands (Brunsting et al., 2011b), Germany (Dütschke, 2011), and Poland (Breukers et al., 2011). These experiences made it clear that if local CCS projects are to take off, the public should be consulted and involved in decision-making about prospective CCS projects. It is also clear, however, that given the generally low public knowledge levels, information provision on CCS as well as on the background of this technology is necessary if the local public is to be involved in a CCS discussion in a constructive and useful manner.

In the previous deliverable for this project (Brunsting et al, 2011a) it was concluded that efforts to raise public awareness and inform public opinion should bear two points in mind. Firstly, local public participation efforts must be informed by research into the current perceptions and information needs of the local public. Top-down information on the process of decision-making and on the techno-economic aspects of the project does not suffice and is even likely to backfire as it is perceived to exclude meaningful public involvement. Secondly, public engagement processes must involve information sources that are trusted by the public and are seen as reliable sources of information.

A wide repertoire of public participation methods that can be applied to live up to these requirements have been developed, tested, and reviewed (see for example ÖGUT 2007, Creighton 2005, Elliott et al 2005, Rowe & Frewer, 2005, Beierle & Cayford 2002). A relatively basic and well-known method is the focus group (Byers & Wilcox, 1991), which usually includes 8-10 participants and has often been applied in CCS research (for a review, see Bradbury, 2012). Building upon the advantages of focus groups but combining these within a larger group setting to improve the efficiency of the method, CSIRO developed the Large Group Process which enables the participation of approximately 100 people without losing the advantages of small group processes (Ashworth et al, 2009). The method has been tested in Australia, Canada, the Netherlands and the UK (Ashworth et al, forthcoming). Other, more complex methods include deliberative polling (Fishkin & Luskin, 1999), consensus conferences (Einsiedel et al, 2001), and citizen's juries (Crosby et al, 1986). Each participation method has its own strengths and limits and there is no single method that enables to reach all conceivable aims. All of these methods have in common that they aim to empower the participants to form an informed opinion concerning a complex issue (such as $CO_2$ storage) independently and in a balanced fashion.

The objective of the present study is to apply and evaluate a newly developed participation method called "focus conference" which will be explained in more detail in the next section.

## 2.2 The focus conference method

The focus conference method aims to foster understanding of the merits of public participation methods in two ways. Firstly, by applying the method in the context of real-life exploration of new CCS storage sites, it aims to go beyond a general discussion of the technology and move on to initiating an enhanced cooperation in planning of new storage sites between project developers, authorities and the local public by testing the feasibility of such cooperation in the field. Secondly,

and related to the first point, it aims to test if the focus conference in its present format, which is more compact than consensus conferences, can still generate robust results while at the same time being more feasible for implementation in the restricted time frames that project developers and policy makers are facing when preparing for a project.

The methodological design of this participation tool is based on experiences of the Independent Institute for Environmental Issues (UfU). In recent years, UfU has conducted several focus group discussions and consensus conferences on technological issues. UfU, ECN and SCCS are the first to apply and evaluate the focus conference methodology in the current form.

The focus conference method structures the participation process in two weekends, which have to be prepared and followed up afterwards. During the preparation and setup of the focus conference, particular emphasis is given to providing knowledge, giving space for open discussions, allowing each participant to gain own experiences and creating opportunities to compare the own opinion with the opinion of others (see Figure 2).

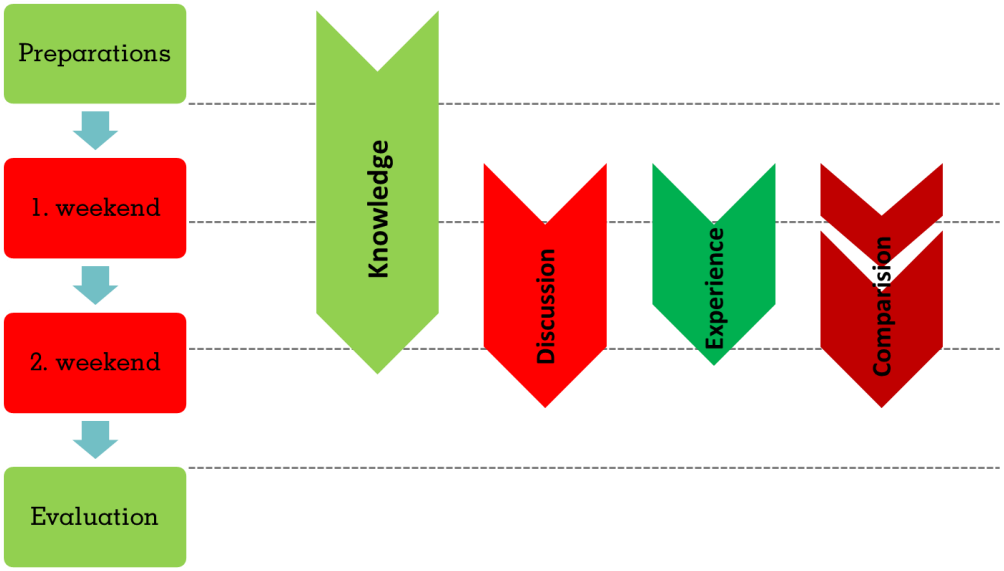


*Figure 2 Phases and elements of the focus conference*

## 2.3 Application of the focus conference method to the SiteChar project

The focus conferences on CCS for the SiteChar project took place on two weekends in March and April 2012 and aimed to include 16 lay people from the local population of two possible $CO_2$-storage sites in Poland and Scotland. The same group participated in both weekends. The aim of the focus conferences was to develop an informed and structured opinion of a citizens group on the chances and risks of CCS technology as well as on the requirements of the participants on a socially acceptable implementation of CCS projects. For each focus conference, a market research firm recruited 16 participants from the local population aiming for a representative sample as much as possible by taking into account several socio-demographic criteria (age, gender, social and labour market position). For their participation, participants received financial compensation for travel, were provided with food and lodging and received an allowance; The height of the allowance was determined together with the market research firm and was based on their previous experiences with similar research methods. At first the research team had aimed for voluntary

participation, however the risk of not finding enough participants committed to participate in a research effort as intensive as the focus conferences was found too great.

During the weekends the participants had the opportunity to learn the scientific, technical and social aspects of CCS technology and to learn different points of view on CCS technology. Experts from research, politics, industry and NGOs were invited to participate in both weekends, during which they gave presentations and answered questions from the participants.

The process of opinion forming during the focus conferences resulted in a positioning paper. This paper was written by the participants during the last weekend of the conference. In the positioning paper the participants wrote, from their perspective, a statement on CCS technology.

The focus conferences were organized by ECN, SCCS (for the Scottish site) and UfU (for the Polish site). Organization included recruitment and invitation of participants, invitation of experts, finding of suitable location for the first and the second weekend as well as organising the catering. UfU worked out a detailed storyboard for the Polish and the Scottish focus conferences. The task of establishing the information was performed by ECN and UfU and based on input and feedback from technical partners (PGNiG and AGH). The focus conferences were facilitated and moderated by SCCS (Scotland) and UfU (Poland). The other partners in work package 8 have contributed to the focus conferences by attending and presenting at the Polish focus conference (PGNiG and AGH) or the Scottish focus conference (Scottish Government).

# 3 Country report: Focus Conference in Poland

## 3.1 Location

The Polish SiteChar focus conference took place during two weekends (30-31 March 2012 and 20-22 April 2012) in the region of Załęcze & Żuchlów. This is the site that is designated for $CO_2$ storage. It lies 60 km north of Wrocław and 100 km south of Poznań. The area destined for CCS encompasses approximately 1000 $km^2$. Administratively the region belongs to the district Góra (voivodeship Lower Silesia) and the municipalities Rawicz and Bojanowo in the district Rawicz (voivodeship Greater Poland). With only 75,176 (2010) inhabitants the region is sparsely populated compared to the rest of Poland. 52 % of the citizens reside in the four cities Rawicz, Góra, Bojanowo and Niechlów, the remaining 48 % live in a total of 157 villages.

The venue of the two weekends of the focus conferences was Pakosław Palace in Pakosław. This location was selected by UfU and ECN during the site-visit in March 2011. This hotel was the only location in the region which met the requirements for organising the focus conference, such as a minimum of two conference rooms and 25 hotel rooms.

The Zalecze & Zuchlow site was claimed as one of the strategic locations for the upcoming $CO_2$ injection program at the national level in Poland (e.g. new demonstration plant of PKE/ZAK Kedzierzyn). It is also representative of sites in the Polish Lowland, which offer a series of natural gas reservoirs with $CO_2$ storage potential. The storage complex has a total area ca. 50 $km^2$, a primary volume of natural gas of ca. 50 billion $m^3$, is at the depth ca. 1300 m and the thickness of the structure is ca. 160 m. Permeability of the sedimentary rocks is very good and the caprock is a complex of Zechstein evaporates with a thickness range between 250 m – 550 m (depending on salt tectonic movement). Presently it is unclear if and when $CO_2$ injection will happen at the Zalecze & Zuchlow site.

## 3.2 Participants

A market research firm recruited 16 participants from the municipalities Góra (5 persons), Jemielno (1 person), Wąsosz (1 person), Niechlów (2 persons), Rawicz (6 persons), and Bojanowo (1 person). There were 8 women and 8 men, aged between 21 to 65, represented different professions and educational levels. Details of the recruitment instructions and respondent profile can be found in Appendix I. Recruitment of Polish Participants. The market research firm signed a contract with every participant, regulated the rules of participation and level of compensation for attendance. Their presence on both weekends was the precondition for the payment. The compensation was paid at the end of the second weekend. All participants were present on both weekends.

**Preparation of the participants**
Before the first weekend of the focus conference the participants received a first overview of the CCS technology. For this purpose, UfU prepared an information letter regarding the project with the same information as provided on the SiteChar website. This letter was send to participants one week before the first weekend of the focus conference.

**Motivation and expectation of the participants**

Participants were interviewed at each of the two weekends by an UfU employee on various topics, in order to indicate their opinions, motivations and experiences. Right at the beginning of the first day the participants were asked:

1. Why have you decided to attend this conference?
2. Have you prepared yourself for the focus conference? How?
3. What do you expect from the conference??

Responses to the first question are listed in Figure 3. More than one answer was allowed. Half of the residents (8 person) answered that CCS is an interesting topic and almost half of them answered they were curious (7 persons). Other indicated that they want to learn more about CCS technology (3 persons) and that it is something new (3 persons). Only 2 persons mentioned climate protection, with one of them saying that this is important and the other saying that climate change is a problem which has to be discussed.


*Figure 3 Answers to question 1: Why have you decided to attend this conference?*

In response to the second question almost all participants (14 persons) answered that they had read the information materials that they had received from UfU before the conference (which consisted of information from the SiteChar website). Only 4 persons looked for additional information on the internet (see Figure 4).


*Figure 4 Participants' answers to question: Have you prepared yourself for the focus conference?*

As Figure 5 shows, in response to the third question most participants expected to gain more knowledge (8 persons) and information about the CCS technology (5 persons). One person considered the information during the conference as important for the region. Other persons highlighted the importance of the positioning paper, the possibility to participate in such an event, the exchange of views with other citizens and the experts and also the possibility to have fun.


*Figure 5 Participants' answers to the question: What do you expect from the conference?*

## 3.3 Experts

The research team decided which experts to invite as speakers to the focus conference. There was not enough time for a broad selection process governed by the citizens. UfU invited 15 experts from politics, industry, eNGOs and research, who are engaged in the topic of CCS in Poland. Seven experts accepted the invitation (see Table 1). Unfortunately, we were unsuccessful in our attempts to get an expert speaker from an NGO from the region. Several companies were approached, but none were able to attend the focus conference.

*Table 1 Participating experts in the Polish focus conference*

| Stakeholder | Organisation | Expert |
|---|---|---|
| **Politics** | Ministry of Economy | Elżbieta Wróblewska<br>Senior Specialist in the Energy Department of the Ministry of Economy |
| **Industry** | Polish Gas and Oil Company (PGNiG) | Marcin Mazurowski - Geologist<br>Grzegorz Sojski – Environmental Protection Bureau |
| **Research** | demosEuropa<br>Centre of the European Strategy | Agata Hinc<br>Managing Director |
| | AGH University of Science and Technology | Czesław Rybicki, D.Sc.<br>Department of Gas Engineering |
| | Polish Geological Institute | Wojciech Wołkowicz, Ph.D.<br>Geology for Land Use Planning and Development Program |
| **eNGO** | CEE Bankwatch Network/Polish Green Network | Kuba Gogolewski<br>Energy campaigner |

## 3.4 First weekend 30-31.03.2012

The schedule for the first and second weekend can be found in Appendix II. The first weekend of the focus conference started with the introduction of the team and the project, a “get to know” round (bingo) and then a presentation of the method of the focus conference. In the following brainstorming session the participants could associate in a free, unstructured manner what they connect with the “$CO_2$”. These associations were noted on cards, sorted and together with participants structured in topics clusters (see Table 2). These clusters were specified and narrowed in the course of the weekend.

The questions debated included the following:

- What role does $CO_2$ play in nature?
- Which physical and chemical properties does $CO_2$ have?
- $CO_2$ in everyday life
- How dangerous can $CO_2$ be for humans?
- Is climate warming a result of $CO_2$ emissions?

It was interesting that at the beginning of the discussion most of the participants were confusing $CO_2$ with CO, which resulted in very negative statements like: “death”, “breathlessness”, “madness” (see Table 2). This misunderstanding was removed after the first expert presentation.

*Table 2 Results of the $CO_2$ association round*

| Thematic cluster | | Associations |
|---|---|---|
| Nature | – | Plants, Chemical elements, Photosynthesis, Formation of minerals, Gas, Volcano |
| Dangers | – | Madness, Breathlessness, Suffocation*, Death*, Greenhouse effect |
| Individual use | – | Fire-extinguisher, Fridge*, Welding, House chimney, Waste incineration, Tires incineration, Coal combustion, Emissions, Soda, Carbon monoxide, Breathing**, Climate protection** |
| Industry | – | Industrial emissions, Mine, Food industry, Distillery, Sugar factories, New chances**, Longer use of coal**, Climate protection** |

* removed after the presentation of Dr Czesław Rybicki

** added after the presentation of Dr Czesław Rybicki

Next Dr Czesław Rybicki, a geologist from AGH University of Science and Technology gave a lecture about the basic features of $CO_2$, $CO_2$ emissions in Poland, the need of $CO_2$ storage, process of carbon capture, transport and storage (CCS), security of the technology and experiences with the storage of acidic gases in Poland. In the following discussion participants had the opportunity to clarify the raised issues with the expert.

Key issues and questions of the first day were documented and structured during the feedback round. This session was also used to ask participants about their associations to CCS technology. The statements had mostly positive connotation and were structured by the participants in three clusters: chances, risks and environment (see Table 3). At the end of the first conference day the participants could carry out experiments with $CO_2$.

*Table 3 Results of the CCS association round*

| Thematic cluster | | Associations |
|---|---|---|
| Chances | – | Recycling of $CO_2$, Increase in coal mining, National energy security, Promotion of the region, Chance for the region, Safe jobs |
| Risks | – | Increase in energy prices, Problems with the transport of $CO_2$ (bad road condition), Dangerous truck transport, Responsibility for the safety |
| Environment | – | $CO_2$ emissions reduction, Environment protection, Observance of the emission norms, Reduction of the greenhouse effect, Safe technology |

The second day of the focus conference started with a warm-up round. Afterwards a short film was shown entitled 'Introduction $CO_2$ capture and storage', which was produced and tested within the framework of the Near$CO_2$ project (Upham et al, 2010). The film introduced CCS, particularly in European context and was divided in four chapters: climate change is a reality, options for combating climate change, what is Carbon Capture and Storage (CCS) and the potential of CCS – pros, cons and different opinions. After the film there was a lively discussion among the participants. The causes of climate change were the main topics of the discussion. Some of the participants were not sure whether the global warming is really caused by anthropogenic emissions. In their opinion the natural processes (e.g. volcanic eruptions) are responsible for most of the $CO_2$ emissions. The group expressed the wish to hear more scientific information and proofs of global warming. During the discussion the participants for the first time start to ask critical questions about CCS technology like:

- How much will this technology cost?
- Will implementation of CCS increase the energy costs?
- How many years will we use CCS?
- Is CCS economically efficient enough?

Then Agata Hinc from demos EUROPA - Centre of the European Strategy gave a presentation on political aspects of CCS technology in the EU and Poland. She also answered the questions raised during the previous discussion.

After the lunch the World Café event was started. The World Café revolved around three questions:

1. Is CCS really a suitable method to protect the climate? Are there other alternatives?
2. What new risks will go hand in hand with the implementation of CCS (also on local level)?
3. Will CCS be implemented in Poland?

The participants were divided into three groups. Each group had 20 minutes to discuss one question. During the discussion round the participants wrote their key issues on the "tablecloths" (see Table 4). After this time the groups had to change the table in order to discuss the next question. So the spectrum on thoughts on every question was completed by the time. At the end of the event two persons from each group presented the main discussion results from one table.

*Table 4* Results of the table discussions (World Café)

| Table | Question | Main issues |
|---|---|---|
| **1.** | Is CCS really a suitable method to protect the climate? AreAre there other alternatives? | – We still have too little information to answer this question, e.g. we don't know if wind farms are more economical efficient than CCS.<br>– CCS is currently too expensive<br>– Poland should develop CCS only if this technology will be introduce on the global scale; CCS only in Poland will not protect the climate<br>– Government should do more to protect the climate, e.g. invest more in development of new technologies<br>– Public awareness campaigns on CCS have to be organised<br>– "No" for atom energy<br>– Open questions: How much the development and introduction of CCS will cost? Who will pay it? How energy intensive is this technology? Where are the potential storage sites in Poland? What role by the project development will the citizens and local government have? |
| **2.** | What new risks will go hand in hand with the implementation of CCS (also on local level)? | – Unawareness of the risks but also chances of CCS in the society is a problem<br>– Tectonic movements<br>– Transport risks<br>– Environmental risks – there are no proofs that CCS is safe for the environment<br>– $CO_2$ leakage<br>– Ground water contamination<br>– Increase in energy prices<br>– Social problems- protest of the local citizens, local communities have to be well-informed |
| **3.** | Will CCS be implemented in Poland? | <u>Arguments for "no":</u><br>– The cost of CCS are too high – UE can't pay 100% of the costs so the Polish society will also have to pay<br>– CCS is not energy efficient<br>– Introduction of CCS can cause an increase in energy prices<br>– CCS is not safe – unknown risks for people and nature<br>– People are afraid of new technologies<br>– Old people don't like changes<br>– Polish society is tired of crisis and changes<br><u>Arguments for "yes":</u><br>– New jobs<br>– Promotion of the region<br>– Poland could play a leading role by the development of CCS<br>There are more arguments against the implementation of CCS in Poland, but it can change in the future. It can happen if e.g. information campaign will be organised or the government will take responsibility for the safety of this technology. |

The second day finished with a short presentation of the time schedule for the second weekend and information about the invited experts. The participants got also "homework" to read between the weekends: three positioning papers on CCS[1] (chosen by UfU) from politics, industry and an environmental NGO, representing different opinions. The purpose of this task was to give the participants the possibility to reflect that there are very different opinions on the same topic and to prepare them for the discussions with the experts on the second weekend.

## 3.5 Activities between the weekends

After the first weekend UfU send e-mails with the presentations of Dr Czesław Rybicki and Agata Hinc and an information letter about the second weekend (time schedule, information about the experts etc.) to all participants. The organisers responded also to individual e-mails from the citizens regarding new questions about CCS technology, and they updated the literature list regularly.

At the beginning of the second weekend of the focus conference the participants were asked questions:

- Have you talked in the meantime with other persons about the topics discussed during the conference? With whom?
- Have you had the opportunity in the meantime to enrich your knowledge about CCS? How?
- Have you any new open questions about CCS?

Almost all participants (15 persons) discussed between the weekends the topic of CCS technology and focus conference with other persons (see Figure 6). Most of the participants talked with family members (8 persons), colleagues at work (5 persons), friends (3 persons) and neighbours (2 persons). Some citizens (3 persons) mentioned that they discussed these topics with all possible persons that they met. Hardly anybody of the dialogue partners knew what CCS technology is.

[1] $CO_2$GeoNet. Podziemne składowanie $CO_2$ – czym jest tak naprawdę? Available at: http://www.co2geonet.com/NewsData.aspx?IdNews=44&ViewType=Old&IdType=18.

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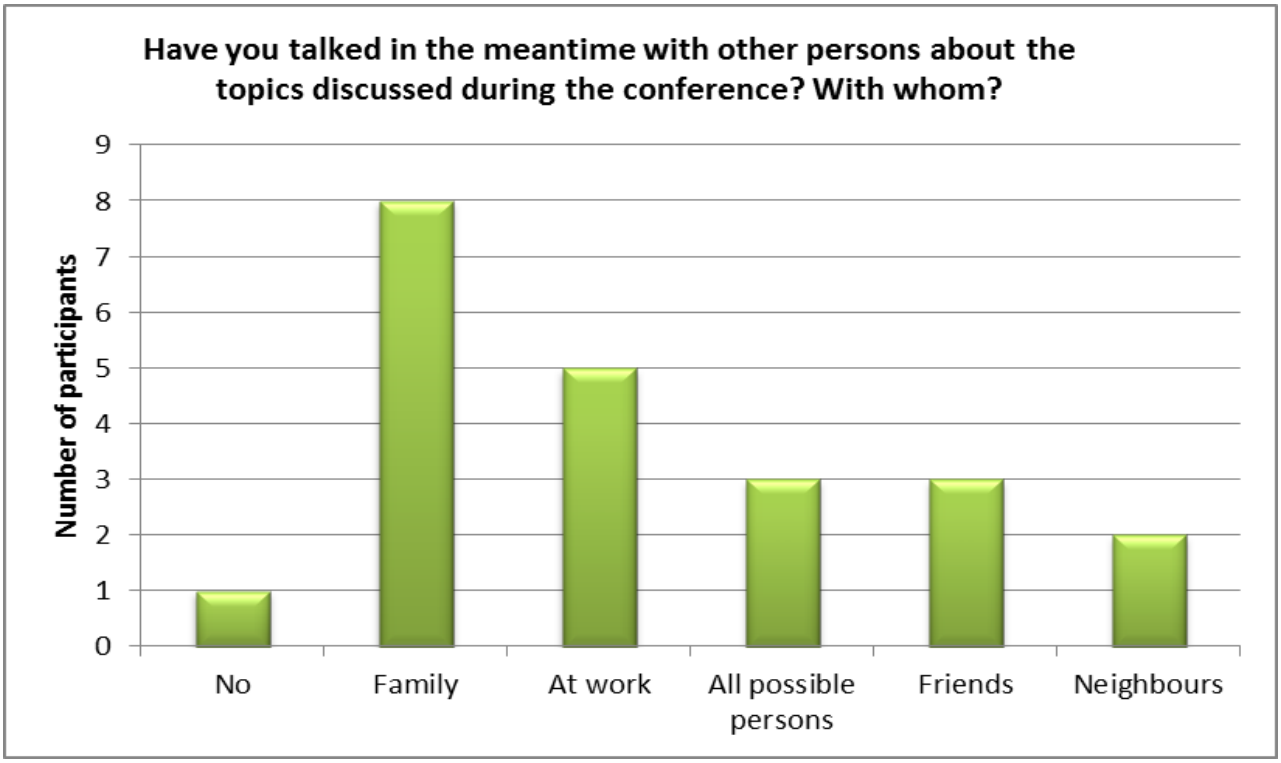


*Figure 6 Answers to question: Have you talked in the meantime with other persons about the topics discussed during the conference? With whom?*

The majority of the citizens (14 persons) looked for more information about CCS technology between the weekends (see Figure 7). 12 persons read information materials which they had received from UfU per e-mail and 10 looked for more information in internet. One person visited the SiteChar website.

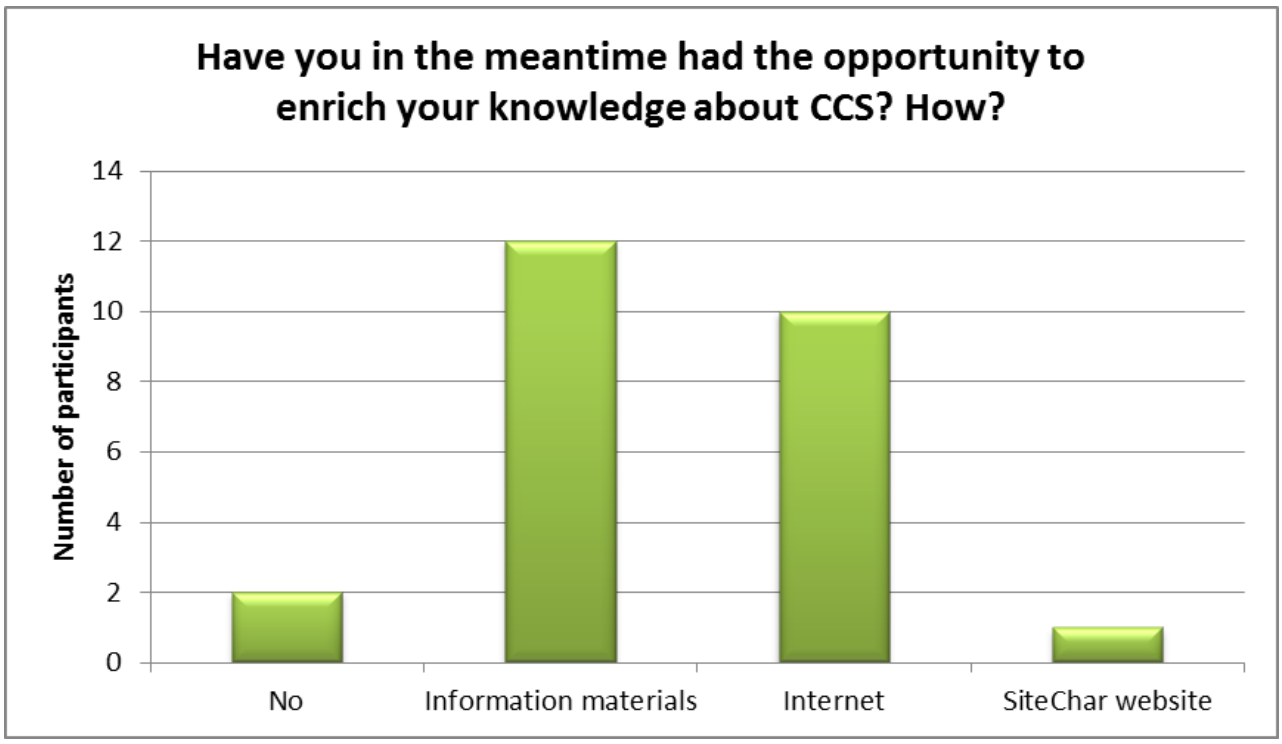


*Figure 7 Answers to the question: Have you in the meantime had the opportunity to enrich your knowledge about CCS? How?*

As a result of discussions with other persons and own researches some participants raised new questions:

- Will only $CO_2$ that was produced in Poland be stored?
- How can we use CCS when most of Polish coal power plants are old and will have to be closed in next few years?
- What are the alternatives to CCS? Do we have a choice?
- Is CCS the only way to reduce $CO_2$ emissions in Poland?

Overall, it can be concluded that the participants were very interested in the topic of CCS technology and motivated to look for more information. They discussed the topic with other people between the weekends and noticed that there is almost no information about CCS on Polish TV and newspapers and that most of the persons with whom they spoke didn't know anything about this technology. Therefore, in the opinion of the participants, it would be necessary to make a public information campaign on carbon capture and storage before more CCS-projects in Poland will be planned and implemented.

## 3.6 Second weekend 20-22.04.2012

The second weekend started with a role-playing game. The participants had to draw their roles (position, main arguments) and were divided into four groups: local government, industry, eNGOs

and citizens. After the preparation time the groups discussed a fictional setting: a public information meeting on CCS project was planned in Załęcze, organised by local government and project developer. The role-playing game was important to give participants a better understanding of the different stakeholder roles.

After the role-playing game Elżbieta Wróblewska from the Ministry of Economy provided an overview of the energy production in Poland (dependence on coal), the Polish energy strategy, position of the Polish government on CCS technology and the Bełchatów project. The second presentation was by Kuba Gogolewski, representative of Bankwatch Network/Polish Green Network (environmental NGO), who explained why the anthropogenic emissions are responsible for climate change (open question from the first weekend) and presented the critical position of his organisation on CCS technology. Wojciech Wołkowicz from Polish Geological Institute then gave a presentation on the state of research of CCS technology in Poland. The day ended with a feedback round.

At the beginning of the second day the participants were asked to position themselves to five statements and questions. The statements and questions were extracted from the discussions during the conference:

1. Is CCS important for the climate protection in Poland?
2. What importance has the implementation of the CCS technology for our region?
3. In my opinion, the Polish government shouldn't longer invest in coal and CCS, but in the renewable energies.
4. Should the Polish government support the implementation of CCS technology financially and politically?
5. Do you think CCS is a safe technology?

For a better understanding of the spectrum of opinions within the group, the participants were asked to take a position in the conference room along a virtual "line" between two opposite "answer fields" and to justify their decision.

Afterwards Grzegorz Sojski and Marcin Mazurowski from PGNiG provided an overview of environmental protection strategy of the company, geological examinations in WP5 of the SiteChar project, position of PGNiG regarding CCS and a development of CCS project in the area Załęcze & Żuchlów.

To give participants the opportunity to learn more about the Załęcze & Żuchlów natural gas fields as well as the gas production in the region, an excursion to the Załęcze gas mine was organised for the afternoon. During the tour, the manager of the mine Józef Szurek explained the geological conditions of the area and the regional gas production process. This visit was organised with help of PGNiG.

During the whole conference the participants were aware that they would have to write a positioning paper on CCS technology at the end of the second weekend. The organisers explained several times the writing process, the main issues and the importance of the positioning paper.

The report writing process started in the afternoon of the second day with an editorial conference. First, the participants discussed the structure of the positioning paper. They decided which main issues and statements should be incorporated into the text. The following topics were defined:

- General information about CCS
- CCS on a national dimension
- CCS on a regional (personal) dimension

The writing process was continued during the next day. In order to work on the three chosen topics for the positioning paper three small groups were formed. Each group had about one hour to write a text about one issue. The results of the work in the groups were then presented in plenary, discussed in detail, modified and supplemented. The resulting texts were, after the break, discussed in plenary again sentence by sentence, edited and approved by all participants. In one case the participants could not find consensus. The diverging opinions were included in the text. In the further course of the writing process the participants discussed and wrote the summary with their conclusions and demands.

After the writing process was completed, the participants decided who would present the positioning paper at the information meeting on 25th June 2012 in Góra (see section 3.8).

The positioning paper has been written by the participants and UfU was responsible only for the last corrections and the layout of the documents. All changes have any way been discussed with participants. The positioning paper has been translated into English by UfU and ECN. In the following section the translation of the complete positioning paper, written by the participants, is shown.


*Figure 8 Participants and organisers of the focus conference in Poland*

## 3.7 Positioning paper

### Introduction

This position paper is the result of several weeks of opinion-forming in the course of the focus conference on carbon capture and storage technology (CCS). The aim of the focus conference was to develop an informed and structured opinion of a citizens group on CCS technology. The focus was on the perception of the benefits and risks of CCS technology as well as on the requirements of the citizens with regard to the socially acceptable implementation of CCS projects.
The group of citizens which participated in the focus conference consisted of 16 persons (8 women and 8 men), who are residents of the municipalities of Góra, Jemielno, Wąsosz, Niechlów, Rawicz and Bojanowo.
The focus conference consisted of two parts. During the first weekend in March 2012, participants had the opportunity to learn about the scientific, technical and social aspects of CCS technology. In the second weekend in April 2012, the citizens learned about different points of view with regard to CCS technology, and they developed their own opinion about this technology, which they have expressed in this position paper. Experts from research, policy makers, industry and NGOs were invited to participate in both weekends, during which they gave presentations and answered questions from citizens.

### General information about CCS

CCS is a new technology of carbon dioxide ($CO_2$) capture and geological storage. According to the European Union, CCS technology will enable Europe to become a global leader in the important and promising field of reduction of $CO_2$ emission into the atmosphere. The goal of the European Union is to check first-hand how this technology works.
By 2020, the $CO_2$ emissions from the EU countries should be reduced by 20%, which on world scale will only be about 3%. As reliable sources report, the primary objective of CCS is the reduction of $CO_2$ emissions to the atmosphere.
Innovative CCS technology hasn't yet been deployed at commercial scale. There is a pilot research project in Germany, where pure $CO_2$ in small quantities, is injected into the ground.
The use of this new technology can reduce $CO_2$ emissions by the combustion processes by 90% or more. CCS technology is still in the research stage of which results will probably be available in 2015.

One of the main arguments, which give the proponents of CCS, is that the mining industry has more than 30 years of experience in the use of technology of underground $CO_2$ injection for enhanced gas and oil recovery.
Austria decided to prohibit underground storage of carbon dioxide in their area.
In the mining and energy industry a dominating belief is that the construction of a new power plant with a CCS installation will significantly reduce its efficiency, which makes such investment unprofitable.
The only CCS project in Poland is carried out by PGE Bełchatów Power Plant.

Poland is one of the most coal-dependent countries in Europe. Approximately 90% of the energy is produced in our coal plants, what is of course combined with high $CO_2$ emissions. If we realize that from the combustion of 1 kg coal we receive more than 2 kg of $CO_2$, then the scale of the problem becomes quite obvious. It forces us to find new technologies that reduce carbon dioxide emissions into the atmosphere as soon as possible. One of these technologies is CCS, but there are also other, already known and proven, technologies.
Injection of carbon dioxide in the existing gas mines can extend their service life up to about 20 years. On the other hand it may inhibit the development of Poland.
The European Union has planned to implement several CCS demonstration projects in Europe. It is feared that Poland could become a "garbage dump" for the European $CO_2$ emissions. There are more threats. In one case, noticed in the United States, stored $CO_2$ escape to the surface and have caused a fatal accident.

**CCS on a national dimension**

The priorities for implementation of CCS technology in Poland are the legal framework and the attitude of the government towards this technology. Significant is also the financial contribution of the state and entities interested in use of the CCS.
There are several locations in Poland, where $CO_2$ can be stored. Only deep geological structures of sufficient tightness, located in areas of little seismic activity, are selected as the storage sites. After a series of tests and analyses, appropriate areas for storage of $CO_2$, including the gas fields Żuchlów and Załęcze, have been identified. These locations seems to be justified also from an economic perspective, because in this area there are still active gas mines. In a period of five years the gas production in these mines will, however, decrease which could lead to the closure of the mines. Therefore, the storage of $CO_2$ in natural gas deposits Żuchlów and Załęcze seems to be well-founded.

Construction costs of the CCS installation as well as costs of the implementation and application of CCS technology are a serious problem. According to experts, the estimated cost of this investment is about 10 billion PLN, however we don't know who exactly will cover these costs. In the face of rising unemployment in the country, this investment would allow to preserve existing jobs, and may even enable to create new workplaces. However, the question arises whether these jobs can sufficiently compensate for the enormous costs related to the implementation of the CCS technology.

Undoubtedly, the introduction of the $CO_2$ capture and storage technology would lead to increased influence of Poland on the European policy on climate protection. At the same time Poland will contribute to environmental protection and fulfill the international obligations related to the complying of fixed limits of $CO_2$ emissions to the atmosphere.
The gas mines Załęcze and Żuchlów have favorable geological conditions for the implementation of the CCS technology, because they are located in the area of little seismic activity. But there is no guarantee, that there will be no unforeseeable phenomena in the future.
The key to success for the implementation of CCS technology is to create an appropriate infor-

mation campaign for the public on a national level as well as providing assurance who will take responsibility for implementation of the CCS project.

## CCS on a regional (personal) dimension

The planned location of the $CO_2$ storage site in the gas mines in Załęcze and Żuchlow raise concerns within the community related to their safety.
One of the risks arising from the injection of $CO_2$ into the ground may be earth tremors, which may adversely affect the safety of $CO_2$ storage. $CO_2$ storage sites may pose a threat to the environment and residents.

The use of CCS technology in both gas mines can extend their service life by several decades. $CO_2$ should come only from the nearest region and be transported by pipelines.
Location of the storage site creates concern about loss of value of surrounding real estates (buildings and land). Residents of the areas, where the storage sites are planned, should be informed about the consequences of the introduction of the CCS technology.

## Summary

**The majority of the group (11 persons) thinks that there are too many uncertainties to clearly opt for carbon capture and storage technology (CCS). The rest of the group (5 persons) is against the application of CCS in the gas fields Załęcze and Żuchlów.**

Poland is a country that is struggling with the current economic crisis. Yes, we care about the environment and reduction of $CO_2$ emissions to the atmosphere, but at present CCS technology is too costly to invest in.
In our opinion, local community should accept the CCS project in the region only if the following conditions will be meet:

- the validity of the CCS project should be presented to the local community,
- the safety of the $CO_2$ storage should be guaranteed,
- appropriate legal standards regulated liability for the implementation and application of CCS technology should be implemented,
- specific data related to employment issues in the implementation of the CCS project in the region should be presented,
- entities responsible for funding of the CCS project should be defined,
- information campaign for the public on CCS technology should be prepared,
- more than 50% residents should agree (e.g. in a referendum) to the realization of CCS project in the area,
- the government should guarantee that the stored $CO_2$ will come only from our region.

**The public should also be informed about alternative solutions (other than CCS) to reduce $CO_2$ emissions to the atmosphere.**

## 3.8 Information meeting

The "Positioning paper of the focus conference participants on $CO_2$ capture and storage technology (CCS)" and its importance for the Polish climate strategy was presented during an information meeting on 25th June 2012 in Góra Śląska to the public, representatives of politics and research organizations. Nearly 40 persons took part in this local event.

# 4 Country report: Focus Conference in Scotland

## 4.1 Location

The Scottish SiteChar focus conference took place over 5 days: 30th & 31st March 2012 in Forres, Morayshire, and 20th, 21st and 22nd April 2012 in Nairn, Invernesshire. Morayshire was selected in 2011 as the main focus of the SiteChar social characterisation and public engagement research through discussions between the Scottish Government (SG) and the project team (SCCS, ECN).

At the start of 2011, the Longannet-Golden Eye project (Scottish Power, National Grid, Shell) appeared to be a very credible CCS project in the UK and it was widely believed that the UK Government's £1 billion would be allocated to this project. If that project went ahead, then public consultations by the project developers would begin in earnest during 2011/ 2012. It was felt that it would be confusing if SiteChar, as a research project, was undertaking public perceptions and public engagement research consecutively with the developers own consultation activities. Therefore, a decision was taken after discussions with the Scottish Government that the SiteChar research on publics should not take place in areas closely associated with the Longannet-Golden Eye project, e.g. around Peterhead and northern Aberdeenshire, where the $CO_2$ pipeline would go offshore. We therefore looked around for other suitable sites and selected Morayshire, immediately to the west of Aberdeenshire, for the following reasons.

1. The SiteChar geological site characterisation in Scotland had identified the Captain sandstone in the Moray Firth as a suitable geological structure for $CO_2$ storage (building upon the work of the Scottish Government and Scottish Carbon Capture and Storage (SCCS) consortium, *Progressing Scotland's $CO_2$ storage opportunities*, March 2011). The Captain sandstone extends a long way into the Moray Firth and out into the Fladen area of the North Sea. It was important to select a site that was congruent with the geological characterisation undertaken within the project. Since suitable geological structures extend right along the offshore part of Moray, the region fitted the requirements. While these formations could probably be used for $CO_2$ storage, it would require longer pipeline infrastructures than use of reservoirs in the Forties area east of Aberdeenshire.
2. In terms of landscapes, use of the marine resource and stakeholder interests, the Morayshire region is similar to northern Aberdeenshire. Employment in the offshore oil & gas sector extends beyond Aberdeen and Aberdeenshire into the Moray area. As mentioned in the Social Characterisation report (Brunsting et al, 2011a), there are several oil fields in the Moray Firth itself and distinctive connections between the region and the marine resource offshore. The coastline south of Aberdeen might also have been suitable but was discounted because of the proposed $CO_2$ pipeline from Longannet to Peterhead, which traversed this region. The stakeholders interviews conducted in summer 2011 as part of the Social Characterisation confirmed that the Morayshire was a good region to select after north Aberdeenshire.

## 4.2 Participants

A market research firm recruited 14 participants. Details of the recruitment instructions and respondent profile can be found in Appendix III. There were 7 men and 7 women at the first weekend, however this dropped to 6 men and 5 women at the second weekend. The remaining 14 participants were from Forres (5), Findhorn (2), Nairn (1), Alves (1), Buckie (2) and Fochabers (3). The longest distance travelled was from Fochabers to Nairn (c. 31 miles). The age range of participants was 39 to 70 years old. Although the market research firm strived for representativeness as much as possible, the group included 4 participants with varying degrees of involvement in the

Findhorn Foundation, a well-established eco-community within Morayshire. These participants brought a critical questioning and capability to examine issues critically and independently, which is likely to have helped empowerment of some other participants.

Participants were paid a daily rate for attendance, but only at the end of each of the two weekends. The hotel and refreshments were all paid for by the project. Because committing to five days is quite a big 'ask', a reasonably generous financial inducement for participating was necessary. We based the amount on previous public engagement research and through discussions the recruitment agency.

Upon reflection after the first weekend, two of the participants decided not to come to the second weekend. They found the content too technical and felt unable to understand it sufficiently. Their decision appears to have been influenced by the information, provided at the end of the first weekend, that all participants would be involved in producing a report on CCS during the second weekend. Just before the second weekend event started, one other participant pulled out, this being due to the need to attend a funeral.

**Preparation of the participants**
Information provided to participants was deliberately kept at a minimum prior to the first weekend. The reason was to avoid prejudicing the first part of the event by providing an opportunity for some people to get 'clued-up' and informed on CCS while other participants would not have had the time to do so. This might have created some unevenness at the start which some could have found off-putting and could have led to loss of confidence on the part of some participants. Since everyone was in the same place of minimal knowledge initially, the group appeared to have a better chance to create its own identity.

## 4.3 Experts

The research team decided which experts to invite as speakers to the focus conference. There was not enough time for a broad selection process governed by the citizens. The experts who accepted the invitation by the SCCS to present at the focus conference are listed in Figure 9.

*Figure 9* Participating experts in the Scottish focus conference

| Stakeholder | Organisation | Expert |
|---|---|---|
| **Politics** | Scottish Government | Stuart McKay<br>Head of the fossil fuel unit in the Energy Directorate of the Scottish Government. |
| **Industry** | Shell | Paul Wood<br>Expert in environmental assessment (last-minute replacement of geologist who fell ill) |
| **Research** | Scottish Carbon Capture & Storage | Dr Stuart Gilfillan<br>Geologist expert on $CO_2$ storage |
| | University of Aberdeen | Professor Alex Kemp<br>Oil and gas economist |
| **eNGO** | - | - |

### 4.4 First Weekend 30-31.03.2012

The program for the first and second weekends can be found in Appendix IV. Scottish time schedules. The event started with an '"ice-breaker" (a variant of bingo) and then an overview of what a focus conference is and guidance on protocol. Three discussion groups were then formed which took as their topics issues relating to quality of life, local environment, what they liked and didn't like about where they live, and so on. This was a deliberately '"bottom-up" discussion, allowing issues, concerns and perceptions to bubble-up and be aired – around broad topics. The Topic Guide for the small discussion groups is shown in Box 1.

***Box 1 : Small Group Discussion – Topic Guide***

*The most important thing here is to get people talking about where they live and how they feel about it, really just to make them comfortable with speaking in the group and getting to know each other. If something interesting or useful regarding CCS is said, it is great, but really the main objective here is to set the scene and get everyone thinking about the environment in which they live. What follows is therefore just guidance, feel free to deviate!*

1. Where do you live?
   - -which town/village?
   - -urban/rural?
   - -how do you travel about?
   - -how do you spend your time in the area (work/leisure/travel)

2. How do you feel about this area?
   - -what kinds of things do you like?
   - -what things are not so good?
   - -what changes have you seen in the time you have lived here?
   - -what would you improve if you could?
   - -why do you live here?

3. What do you think about the natural environment you live in?
   - -what places around you do you think of as 'natural'?
   - -how often do you spend time in 'natural' places?
   - -is this a pleasant environment to live in?
   - -what might you think of as 'unnatural'?
   - -what places around here are most meaningful to you?

4. How do you feel about environmental issues?
   - -what do you think the key issues facing society are?
   - -what about Scotland?
   - -what about Moray?
   - -what kinds of 'environmentally-friendly' things do you do in your everyday life?
   - -why do you do these?

5. Anything else you'd like to mention about this area and the environment?

A 90 minutes session followed, which was the first of the four expert presentations. Dr Stuart Gilfillan, a geologist expert on $CO_2$ storage from Scottish Carbon Capture and Storage (SCCS) (University of Edinburgh), provided an overview of climate change, the need for deep $CO_2$ cuts over the next few decades, the main technologies available and then focusing on $CO_2$ capture and, in

particular, geological storage. In reality the session lasted for c. 120 minutes due to the large amount of information presented and the extensive questions which were asked.

The final session consisted of participants working in pairs to come up with their key issues and questions on the material presented by Dr Gilfillan. All these points were then presented in plenary and clustered by the moderators into issue-domains: local economic impacts; alternative uses of $CO_2$; urgency; how to motivate people; national issues; and division of responsibility.. After the dinner, the film *An Inconvenient Truth* (presenter: Al Gore) was shown.

In general our perception is that the first day was successful and a group identity began to develop. The underpinning information was effectively conveyed and discussions started. The film showing was less successful as several participants took against its very US style of presentation, argumentation and sentimentalisation.

The second day started with a short film that was made by Dr Leslie Mabon and Eduardo Serafin, School of GeoSciences, University of Edinburgh. The 'talking heads' each spoke for a few minutes on $CO_2$ capture and storage and included a range of geologists and energy specialists (e.g. Professor Stuart Haszeldine, Dr Vivian Scott, Dr Saran Sohi, Dr Neil Burnside, Jen Roberts, Jamie StewartPearce, etc.). The aim was to 'humanise' CCS – by showing that a wide range of people do CCS research (e.g. students to Professors) and to explain their motivations. Professor Alex Kemp, one of the UK's most eminent oil and gas economists, then gave a presentation entitled 'CCS in Scotland and its possible impact in the oil field areas'. He presented a wide range of studies of CCS development in Scotland, including the economic prospects for $CO_2$ enhanced oil recovery (CO2-EOR).

The afternoon of the 2$^{nd}$ day was devoted primarily to a World Café event, in which three tables discussed a different issue each. One table looked at local economic impacts and alternative uses of $CO_2$, the second discussed urgency and how to motivate people, and the third focused on national impacts and division of responsibility. Participants spent about 20 minutes on each table and then moved around individually (i.e. so that each table was a new mixture of participants). Each 20 minute session at each table was asked to produce three key messages. These were written up on post-it notes and put onto boards. The process is described in more details in Box 2. Towards the end of the second day, organisers went around the room and asked everyone to say something about how they were feeling about: CCS, climate change, carbon emissions, the day's talks, the process, or anything else relevant. The general consensus was one of enthusiasm towards the whole process – with one participant even wanting to start writing the report right away – but also that the participants would need time to digest all of the information they had received over the two days. The main outcome from this discussion was that the participants requested summaries of the presentations given by Dr Gilfillan and Professor Kemp. The second day finished with a short introduction to the second weekend, during which it was mentioned that, by the close of the event, participants will be asked to write their own report on CCS.

## *Box 2 : Expert/World Cafe Discussions – Topic Guide*

*As we all know the best thing is (within reason!) to let the discussion flow in whatever direction the participants take it, as this opens up a space where people feel comfortable to express their opinions etc etc. - Nonetheless, it's probably helpful just to make sure the participants have touched all the issues and haven't overlooked something – this can be particularly important for getting less vocal members of the group involved.*

1. Benefits
   - -energy
   - -economic
   - -socio-political
   - -other?

2. Costs
   - -economic
   - -political
   - -social
   - -cultural (e.g. loss of valued landscapes, legacy for future generations)
   - -other?

3. Risks
   - -political
   - -socio-cultural
   - -techno-scientific
   - -other?

4. Feelings
   - -how do you feel about CCS?
   - -how does this way of thinking about mitigating climate change make you feel?
   - -how do you feel about climate change more generally?
   - -what kind of solutions do you think are appropriate?

The topics of discussion for the three tables were as stated in Section 5.4: local economic impacts/alternative uses of $CO_2$; urgency/how to motivate people; national issues/division of responsibility. The same topic guide was used for each of these discussion topics.

### 4.5 Activities between the weekends

One week before the second weekend a mailing was sent to all of the fourteen participants of the first weekend. This contained a cover letter and three documents: a summary of Dr Gilfillan and Professor Kemp's presentations; and a New Scientist 'glossy' publication introducing the key facts about CCS in easily-understandable terminology written by Professor Haszeldine and Dr Scott of the University of Edinburgh. The summaries of the two expert talks were actually sent in response to a request by several of the participants. We also sent around a link to the Greenpeace False Hope report of 2008, which was highly critical of CCS. This was performed in response to one participant who had come across the report and suggested to us that others might if interesting.

During the second weekend, it was evident that several participants had identified quite a lot of further information on the internet about CCS. For instance, one participant raised the question of Lake Nyos in Cameroon. It was interesting to note that smart phones and Blackberry's also al-

lowed several participants to search for information during the second weekend. One participant had actually written his own report on CCS before the second weekend commenced. It is worth noting that between the two weekends, the UK government announced a new CCS competition. This took place on 3rd April 2012 and generated a reasonable amount of media attention.

## 4.6 Second weekend 20-22.04.2012

The first day of the 2nd weekend began with small discussion groups on what the participants were now thinking about CCS and whether they had any thoughts, or had heard any more information about it. Many participants had picked-up on the UK Government's announcement of a new CCS competition (3rd April 2012).

There were then two 90 minute slots for the final two expert presentations. The first was by Stuart McKay, the head of the fossil fuel unit in the Energy Directorate of the Scottish Government. He explained the remit of the Directorate and of the fossil fuel unit, as well as policy and decision-making more generally. He then went on to outline where CCS fits in and the Government's intentions. The second presentation was by Paul Wood, a representative of Shell, which is developing the Golden Eye storage site (a depleted oil field) in the North Sea. The head of the group who was supposed to have given the talk was taken ill the day before and a substitute represented the company. The substitute was an expert in environmental assessment of the project, but he was not a geologist, so he found some of the geological-type questions difficult to answer.

The first day finished with a review of the key questions and domain-issues that had been developed at the end of the first weekend. Small groups reviewed the questions and suggested modifications and new questions to address. The modifications suggested by the participants were intended to narrow down the focus of the questions, for instance 'is CCS really necessary' was refined to 'How convinced are we that CCS is worth pursuing in order to meet carbon reduction targets and stay within 2°C of warming?' The new questions added were on the risks of CCS, its benefits for Scotland, and the role of the international community. By the end of day one, a complete list of questions for the report to address was agreed. These questions were reviewed once again at the start of the second day and finalised. The second day was devoted to discussing the key points under each question, initially in three small groups, and then in plenary. The report writing process is described below and is also appended in the stand-alone version of the positioning paper itself.

The original intention was that the focus conference participants write the report. The Scottish event organisers had originally envisaged that a different participant would volunteer to write each of the various sections (or that some would write two), with no input at all from the facilitating team. However, this process was modified slightly in response to input from the participants themselves over the course of the focus conference.

After the first four questions had been written up (or were in the process of being written up), no volunteers were forthcoming to write up the remaining three sections. Attempts at gentle coercion from the facilitators failed to encourage any further participants to write, however the participants indicated they were keen for the sections that had not yet been written to remain in the report, even in the absence of further writers. It was thus suggested that three of the organisers each collate the information for one section and convert this from note to prose form. The group all agreed that this was an agreeable and effective solution.

As the points discussed during the plenary sessions for each question had been transcribed almost verbatim onto a PowerPoint slide, the job of the facilitator here was merely one of ordering

the existing points and adding words to make the bullet points flow as a coherent set of text. When this work of ordering the text had been completed, the participants in plenary reviewed the collated text word for word, suggesting structural and grammatical changes along the way to ensure clarity of meaning. In a few instances, additional points came up during the plenary session and individual participants came up with an appropriate formulation to add to the existing text. This process – exactly the same as the one applied to the sections that had been typed up by participants – continued until everyone was happy to accept the text.

In addition, the report also contains some material that was added by the facilitators at the request of the participants. The group asked the facilitators to write an introduction and an executive summary for the report – the participants felt this would give the report a more comprehensive and professional feel, and suggested that the 'overview' the facilitators had of the whole process made them the most appropriate people to do this. During the third day of the second weekend, one of the facilitators thus drafted an introduction and executive summary to be placed as a preface to the positioning paper. This draft text was then reviewed by all participants during a plenary session, with the group discussing and agreeing on content and structural and grammatical changes. Again, this process continued until all the participants were satisfied that the introduction and executive summary were a fair and accurate representation of their work.

Some of the writers also explicitly asked the organisers to check facts and/or add figures to the report. They were keen for the organising team to do this, as the group felt that this factual accuracy would give their report more rigour and credibility. For example, it was requested that a brief paragraph was added explaining the history of social science research on CCS, and also that a figure be sourced after the weekend that could represent the 'timeline' for CCS rollout. Any material added in this way during the 2nd weekend was reviewed in plenary and accepted verbatim, while material added after the 2nd weekend was sent out for review via email.

It is crucial to register here that this additional element to the process comes at the request of the group itself. The addition of figures and facts at a later date and the writing of an introduction/executive summary during the course of the 2nd weekend, were things that the participants explicitly asked the organisers to do for them. Any material collated or added by the facilitators was reviewed, discussed, revised and agreed word for word in plenary. All participants were in agreement with this process, and all agreed that doing so would make the whole process and its outcomes more valuable and worthwhile for them.

## 4.7 Positioning paper


# Executive Summary

This positioning paper was jointly drafted by the participants of the SiteChar Focus Conference held in Morayshire, Scotland in spring 2012. The conference was organised to gather the opinions of members of the Moray public towards the development of carbon capture and storage (CCS). The conference was held over two weekends, and was attended by eleven members of the public.

Over the two weekends the participants were presented with a detailed description of climate change and CCS. A range of stances towards CCS emerged within the group as discussions unfolded. This report attempts to encompass all of these viewpoints and allow them to sit alongside one another.

One of the key things to note is that all the participants agreed that something must be done to reduce carbon emissions and curb climate change, and that doing nothing is not an option. However, at the end of the process, the participants expressed a range of views on CCS. Some participants concluded that CCS should be one of a suite of options that could help to achieve carbon reduction, whereas others were opposed to the development of the technology. Still other participants indicated that they wished to reserve judgment until more detailed information was available.

The main reasons for supporting CCS were the potential for climate change mitigation and the potential boost for Scottish jobs and the economy. The main concerns with CCS were that it could divert attention from renewable energy technologies, and energy efficiency measures, which were viewed as the preferred long-term solutions. There was also concern within the group about the potential unknown risks of CCS.

The timescales involved with developing CCS were considered by the group. There was concern that if CCS is considered to be a viable solution for meeting climate change targets, then it must be developed faster to ensure that the targets are met. The group argued that it is crucial to remember that CCS is a short-term option that would buy us breathing space while other more permanent low-carbon solutions are explored. There was also active interest amongst the group in other potential uses of carbon dioxide aside from geological storage. Potential applications in the chemical, construction, and agricultural industries were all explored.

Risks regarding CCS were conceptualised by the group in a number of different ways including: geological; health; economic; safety; environmental; and socio-political risks, as well as the psychological impact of risk information itself. Due to the number of questions raised and uncertainties acknowledged, some participants found the amount of yet unknown risks to be too great in order to support CCS.

Perceptions within the group also varied as to whether CCS was a good thing for Scotland. There was an acknowledgment of the economic benefits of the technology and of the opportunity for Scotland to become a world leader in the field. At the same time, however, questions were also asked of whether CCS was simply being developed as it is a politically attractive solution, one that could deliver on short-term targets.

The group agreed that it was important for governments and policy makers to fully involve the public in climate change mitigation decisions and actions, and to take seriously the views of the public. In order to do this, it is suggested that public consultation begins early, and that the public are provided with information that they can trust. As for the role of world governments, institutions and organisations in changing behaviour, the sharing of knowledge and experience is vital. Where CCS research, development and demonstration is being wholly or mostly publicly-funded, then there should be an obligation for the findings and information obtained to be made available in the public domain. At the minimum, the public should be consulted about whether they would like such information to be shared and how.

On the final day of the process, the eleven participants voted on their stance at that moment towards CCS. The results of this vote were as follows:

Actually, on balance, we:
Want CCS along with other measures: 5
Don't want CCS but prefer other measures: 2
Are undecided as to whether we want CCS: 3
Abstention: 1

## Introduction

This positioning paper summarises the discussions, perceptions and findings of the Focus Conference conducted in Moray, Scotland for the SiteChar research project.

The intended outcome of the Focus Conference process was that the participants (11 members of the public) together would produce a positioning paper on carbon capture and storage (CCS). The positioning paper reflects the group's views on the technology in light of the information received during the conference from CCS experts, and the discussions held with the experts and each other. The participants did not need to reach agreement on all issues, different viewpoints are acknowledged alongside one another in the paper.

The Focus Conference was convened as part of Task 8.2 for the European Union-funded SiteChar project – a parallel Focus Conference was held at the same time in Poland. What SiteChar aims to do is to characterise sites that are potentially suitable for the geological storage of carbon dioxide ($CO_2$). This characterisation involves looking at the geological, infrastructural, legal and social characteristics of sites that are possibly suitable for the geological storage of $CO_2$. Whilst there are at present no actual plans for storage in the geological structures under the Moray Firth, the area's geology has been identified as being potentially suitable for $CO_2$ storage.

The Focus Conference took place in local hotels on two weekends (30-31 March and 22-22 April 2012). Over the two weekends the participants received information on CCS, which encompassed a general overview of CCS technology, the economic aspects of CCS, information on the policy elements of CCS in Scotland, and a detailed look at one developer's particular role in CCS. Participants had the chance to ask the expert presenters questions, and to discuss the information they received among themselves.

The paper takes the form of seven questions which were formulated by the conference participants. The group believes that these questions encapsulate all of our ideas, opinions and con-

cerns in relation to CCS.

1. How convinced are we that CCS is worth pursuing in order to meet carbon reduction targets and stay within 2 degrees warming?
2. If CCS is a solution – is it developing fast enough, and how can we make it work in time?
3. Is CCS the only solution to meeting the carbon reduction targets?
4. What are the risks? Are these risks acceptable? What about the risks we don't yet know? Are we being told all the risks?
5. Is it good for Scotland? What is the *real* motivation? (jobs, skills, economy, carbon reduction, international profile etc.) Is it good for the rest of the world? Is it viable in the rest of the world?
6. How do we ensure the public are involved in climate change mitigation decisions and actions? Is public opinion really acted on? How do we ensure representatives of civil society organisations are involved in a positive manner?
7. What about the roles of world governments /institutions /organisations in changing behaviour? Is there the will to share knowledge and experience?

**Background context to the Focus Conference**

It has been envisaged that CCS demonstration projects would be in place by around 2015, with lead rollout around 2020 and global deployment around 2025 (see figure 1). It is important to note, however, that technical, political and social challenges – not to mention a tough economic climate – mean these targets are unlikely to be met.

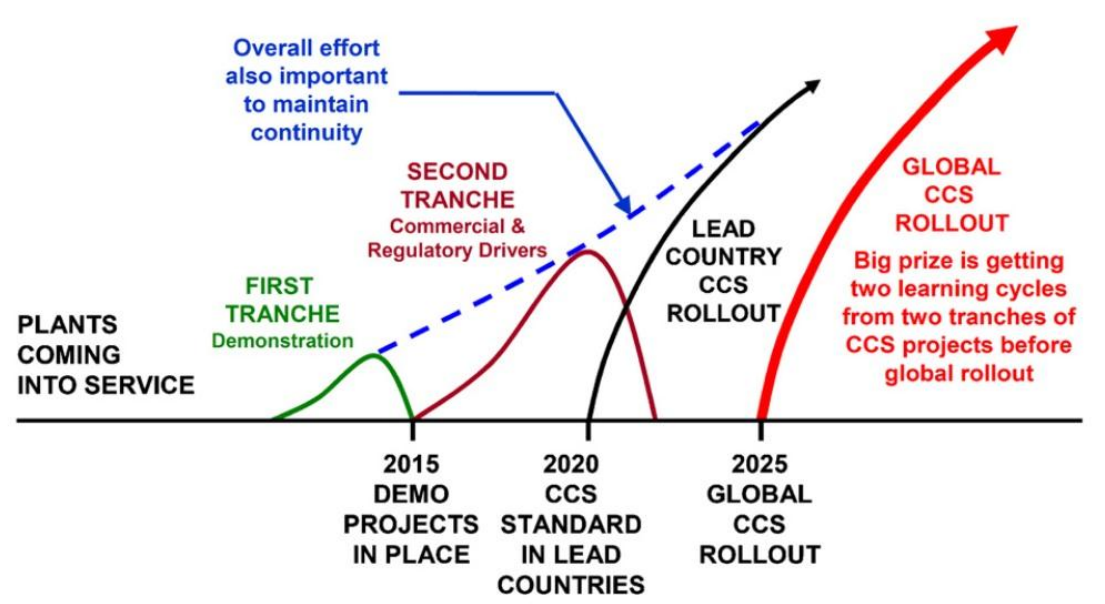


*Figure 1: Timeline for anticipated CCS rollout (Source: Gibbins and Chalmers, 2008).*

This timeline, and indeed the timelines for all forms of low-carbon energy, relate to the targets set by governments in order to avoid catastrophic climate change. For instance, the 2009 Copenhagen Accord agrees on the goal of limiting warming to two degrees Celsius globally, and it is widely acknowledged that deep cuts in human $CO_2$ emissions will be required to achieve this. Scotland has set the target of producing 80% of its required energy from renewable sources by 2020.

Social science research on CCS has been going on for nearly ten years now, starting with early studies into the general potential of the technology carried out by the Tyndall Centre in Manchester. As the technology develops and demonstration projects get nearer to rolling out, more social science work has been done. This has taken several forms including surveys and questionnaires (for instance in Holland and Japan), interviews with developers (Italy, UK), and discussion groups among members of the public (Australia, USA). As CCS is still at an early stage, however, it is important to note that there is only a relatively small amount of work that deals with people's perceptions of actual CCS projects. Nevertheless, with projects such as Barendrecht in the Netherlands demonstrating the power of public opposition to stall or stop CCS, awareness of the importance of effective public consultation is starting to spread beyond the academic social science community.

*The SiteChar Moray Focus Conference participants*

Authors: David Bruce, Marion Caldwell-Hardie, Paul Johnson, Hugh Lawson, George MacKenzie, Jan McPherson, Sue Powell, Martin Roche-Nishimori, Elaine Silverwood, Roger Way, Sam Young

**1. How convinced are we that CCS is worth pursuing in order to meet carbon reduction targets and stay within 2°C of warming?**

All of the participants agreed that we must do something to address the current situation of climate change being brought about by excessive levels of atmospheric $CO_2$. All participants agreed that doing nothing is not an option.

Positive factors raised for going ahead with CCS included: it can in a relatively short time, show significant progress towards achieving our carbon reduction targets; in Scotland there is an oil and gas infrastructure already in place that could be used for CCS; it could create jobs as well as income at a time where other energy industries may be coming to an end in Scotland; Scotland could take a lead in the CCS industry and be an example to other larger carbon emitters; we would be doing something to help the global challenge of $CO_2$ emissions.

Nevertheless, a number of concerns and questions were raised regarding CCS: is it tried and tested enough? (Scientific studies appear convincing but there are still major uncertainties which as we speak are being researched regarding the effect on human/marine life.) Globally, can it be rolled out in time?; it could divert from investment in renewables; it would maintain the status quo of high energy usage/wastage; even if a time limit for CCS were put in place (whilst other sources/projects are developed) the Government would have little/no power to stop private industry from continuing with CCS once it begins; and CCS seems to be incompatible with permaculture principles.

Among those participants convinced of the use of CCS, it was agreed that it should only be undertaken as part of a package of measures and be time-limited. The group wished to see more investment in re-utilisation of $CO_2$ as opposed to $CO_2$storage, as well as in renewable energies. Some concern was expressed that the Scottish Government have been seduced by the 'quick fix' option that CCS promises.

Looking at the bigger picture, this 'crisis' could be seen as an opportunity to invest in creative solutions for the benefit of the human race and the planet as a whole. Questions need to be addressed as to how to encourage, motivate or force the change which needs to happen on a micro and macro level.

**2. If CCS is a solution – is it developing fast enough, and how can we make it work in time?**

To answer this question we must firstly assume that we agree with the statement that we believe CCS to be a solution. This is not the case for all members of the group.

Having said that, it is clear that the process of CCS has already started at different speeds in different parts of the world. For example, Norway has been capturing and storing carbon under the North Sea since 1996.

It seems apparent that by utilising and developing the existing infrastructure within Scotland that it would be possible to successfully meet the Scottish carbon reduction targets, but the group wishes to stress that the development of CCS must also be ‘fast enough’ globally to make it worthwhile to undertake i.e. not just to be developed and implemented within Scotland.

It is also important to stress that ‘fast enough’ does not necessarily mean ‘as fast as possible’ or ‘at all costs’. We believe that whatever happens with CCS technology that it should be developed on a parallel track basis with the development of other renewable technologies which will more effectively address the underlying core issue of $CO_2$ emission reduction in the first place.

In line with this parallel track approach we believe it important that an exit strategy should be developed at the outset within Scotland to address how to scale down and then ultimately exit the

CCS industry completely at a later point in the future.

In the short to medium term, the group considers that the following action points will encourage the significant levels of investment required to develop and implement CCS technology within Scotland in a timely and effective manner.

*Recommendations:*

1. A higher price for carbon under the EU Emissions Trading Scheme from its current level of c. £7/tonne to £70/tonne.
2. We encourage the additional introduction of a carbon levy across the economy.
3. The use of 'Contract for Difference' type contracts where the Government guarantees an income to the Energy company who is producing the carbon to incentivise them to capture and store the carbon, thereby developing a critical mass in this area, or where the government pays the difference between least cost production and the cost for CCS.
4. The use of grant aid which can already be evidenced by the recent re-launch by the UK Government of the £1 Billion CCS competition.

In addition to these specific action points, and in line with the parallel track approach outlined above, the group also believes that some sort of levy should be made on energy companies to be used to contribute towards the ongoing development of renewable energy technologies, together with other means of carbon recycling.

In summary therefore it appears that the development of CCS technology could help to provide a fairly lengthy 'breathing space' i.e. at current levels of $CO_2$ emissions CCS could provide up to 100 years of $CO_2$ storage capacity in the North Sea for the 27 member states (Gilfillan, 2012). However in geological and planetary terms this is not that long a time period and the group feels that it is essential to continue to highlight from the outset that CCS is only one short-term strand within what will need to be an overall global strategy for dealing with climate change issues.

**3. Is CCS the only solution to meeting the carbon reduction targets?**

CCS should not be viewed as the only solution, but could be one solution that can, in a relatively short time, show significant progress towards achieving our carbon reduction targets and staying within 2°C warming.

If we are to undertake a holistic solution then this must also include increased efficiency in both production and consumption of energy and a greater contribution from the emerging renewable energy sources, e.g. wind, solar, wave, hydrogen fuel cells.

A greater understanding of the global impacts of our current lifestyle must also be developed within the general population, therefore education, from an early age, should be viewed as a useful tool for change in the context of reducing the amount of $CO_2$ emitted in the first place.

By accepting that $CO_2$ is released by the burning of fossil fuels it follows that we must also consider ways in which we can trap some of what has already been released though garden/woodland/forest planting schemes worldwide.

If we are to attempt to solve this most significant problem before global warming exceeds a safe level (2°C) then the group believes that CCS alone cannot achieve this. However, if we undertake

CCS in association with greater efficiency in current energy production methods, alternative means of transportation i.e. electric/hydrogen vehicles, increased renewable energies, changes in lifestyle, controls over acceptable construction methods i.e. magnesium based concrete, better education, and an increase in global arboriculture we can expect a greater impact.

**What can be done with $CO_2$ that demonstrates a significant climate mitigation impact other than storage?**

It is very hard to define what 'significant' means in the context of emerging technologies. Although CCS may be considered as a primary contributor to both achieving the Government's carbon reduction targets and thus helping to combat global warming, it may be foolish to believe that this technology alone can address this most important of issues.

Across the world there is a lot of interest in addressing the problem by means other than simply burying it under the ground or sea. One common strand that runs through many of these schemes appears to be that the developer of the technology, through a simple change of paradigm, views $CO_2$ not as a 'problem' or pollutant, but as raw material and as such, of value. Perhaps this is not an issue of removal but of recycle.

*Recommendations:*

1. Develop an education curriculum related to $CO_2$ awareness for integration into main stream education.
2. Secure significant funding to ensure continued research, development and innovation in low and zero $CO_2$ energy production technologies.
3. Incentivise the continued development and usage of renewable forms of energy.
4. Continue to develop technologies related to the usage/conversion of $CO_2$ into source materials i.e. fuel, chemicals, pharmaceuticals, building materials.
5. Promote $CO_2$ capture through land management/arboriculture schemes.
6. Investment in small scale $CO_2$ reduction/usage projects and technologies.
7. Include on all packaging an estimate of carbon emissions to point of initial sale within the UK.

***Box 1: A summary of potential alternative uses for $CO_2$.***

***Chemical industry***

The global chemical industry currently uses about 115 - 120 million tons of $CO_2$ each year as a raw material to manufacture other chemicals and products ranging from Asprin through to fertilisers.

Although a significant increase in usage for this purpose may be viewed as slight against a global $CO_2$ emission total of an estimated 30 billion tons annually, any technology utilising $CO_2$ must receive serious consideration.

***Construction industries – contribute 10-13% world $CO_2$ emissions***

Currently the building industries contribute about 9-10% of the world's annual $CO_2$ production (6 billion tonnes). Most of this is as a result of the production of cheap cement based concretes to be used in roads and buildings.

If we were to change the chemical composition of the concrete and use magnesium instead

of Portland cement, then this simple act would not only reduce significantly the level of $CO_2$ production in manufacturing but also continue to leach $CO_2$ our of the atmosphere locking it into the concrete for many thousands of years.

For every ton of cement made we would be sequestering half a ton of $CO_2$.
Most power stations burn coal, oil or natural gas to produce the heat necessary to generate electricity releasing both the $CO_2$ and surplus heat to the atmosphere. If these gases were passed through seawater then it is possible to use up to 90% of the extracted $CO_2$ in the production of cement.

By incentivising this process it may encourage this 'second stage' of the energy process to be developed thus reducing global $CO_2$ production levels by 6bn tonnes per year.

One company, Calera, has set up a pilot plant at Moss Landing because California is soon to adopt regulations limiting the amount of $CO_2$ power plants and other sources can emit, and natural gas is the primary fuel of power plants in that state. According to a Calera company representative Constantz, some flue gas is already running through the company's process. "We are using emissions from gas-fired generation as our $CO_2$ source at the pilot plant where we are making up to 10 tons a day," he says. "That material will be used for evaluations" said Constantz

http://www.scientificamerican.com/article.cfm?id=cement-from-carbon-dioxide

***Plastics from $CO_2$***
Although still in early stages of development we understand one promising process being developed in the United States involves making polycarbonate plastics that contain up to 50 percent $CO_2$ by weight. In a world that relies so heavily of the usage of plastics in almost every walk of life, this could represent a technology worthy of major investment.

***Producing fuel from $CO_2$***
This can be done by extracting $CO_2$ from seawater, then combining it with hydrogen over a catalyst to produce ethanol, methanol, butanol and even ethylene. If further processing can result in biodiesel and petrol then it is fair to believe that as the demand for transportation increases so too will the usage of $CO_2$.

http://video.google.com/videoplay?docid=-8408267073497670096#docid=6979512017110280792

***Reverse combustion***
A Princeton University lab of chemists is developing a process where $CO_2$ interacts with the charged metal plates and with the help of a catalyst, begins to form bigger molecules that combine carbon, hydrogen, and oxygen atoms otherwise known as hydrocarbons. These are the molecules that make up the fuels that power the modern world — coal, natural gas and oil all fuels suitable for burning and thus generating energy.

http://e360.yale.edu/feature/using_co2_to_make_fuel_a_long_shot_for_green_energy/2405/

**Agricultural benefits**
It has long been known that increased $CO_2$ levels in greenhouses promotes higher growth levels in plants and flowers even where growing conditions are not perfect. As human needs for food continue to grow it would be fair to expect that this technology may be viewed as

essential in feeding both people and animals alike.

This content of this box was been researched and developed by Paul Johnson, one of the members of the group.

**4: What are the risks? Are these risks acceptable? What about the risks we don't yet know? Are we being told all the risks?**

Risks regarding CCS were conceptualised by the group in a number of different ways including: geological; health; economic; safety; environmental; and socio-political; as well as the nature of risk information itself.

Much discussion within the group concerned the unknown, and hence seemed to raise more questions than answers. For example, in terms of potential corrosion of pipelines and a sudden eruption of $CO_2$, what area would be affected? What would happen if there were to be an eruption from a pipeline in a densely-populated area? What risks are associated with the gasification, liquefaction, transportation and storage of $CO_2$? What are the risks associated with the chemical transformation of the rock injected? Has anyone undertaken a projection of a worst-case scenario? How much $CO_2$ would escape? What would the risks be? Has the risk of a terrorist threat to aspects of the CCS process been considered? How much does it cost to control or manage these risks? Alongside these questions was the recognition that research being undertaken into some of the effects of CCS on the seabed (QICS project at Oban) were yet to be published.

Due to the number of questions raised and uncertainties acknowledged, some participants found the amount of yet unknown risks to be too great in order to support CCS. According to the permaculture principle of looking at the effects of an activity seven generations down the line, CCS may not be a sustainable option if we, as a species, were to create an industry with such significant impact that our future generations may not have the technical capability to cope with it.

Essentially CCS is going against nature rather than working with it, so the potential of unknown risks could be immense. There are assumptions that the risks are low and that the $CO_2$ is inert. Thus far, industry liability has been spoken about in terms of thirty years post last injection to a site (with liability transferring to government, and therefore the public purse, thereafter). However, this figure of thirty years, whilst commonplace in business planning, is insignificant in geological terms, and in terms of the amount of time for significant chemical and structural changes to become apparent.

Specific known safety risks of concern related to the increased use of coal and water in the various CCS processes were summarised as 'side-effect' risks. For example, the known safety risks associated with coal mining were only going to increase since more coal would be needed to create the same amount of energy at coal-fuelled power stations with CCS in place. There was also the associated risk of encouraging more coal production and water use when we are already aware that these resources are diminishing.

Risks considered at a more macro level included the risk of CCS becoming an end in itself; rather

than the currently envisaged 'stop gap' to help reduce our carbon emissions. The group recognised that once the industry becomes established it would be difficult to stop it. The risk of its continuation may well be levelled with counter claims of the risk of losing jobs within the CCS industry, or destroying communities built around such employment. In such a scenario CCS contributes to society being 'locked in' to a dependency on fossil fuels and the associated industry of CCS processes.

Akin to this risk of CCS becoming permanent is the risk of associated complacency. If CCS becomes part of the status quo then there is a risk that society stops looking for alternatives, or at least reduces the importance placed on finding more sustainable options as quickly as possible – not least of which is the need to reduce our reliance on fossil fuels and energy.

The group also recognised that the perspective of risk is likely to be different depending on the vested interests of the individual, organisation, or industry involved. For example, some may advocate an 'acceptable' rate of leakage of $CO_2$ into the sea. For others, any rate of leakage (over time) would negate the proposed benefits of CCS. Some risks associated with leakage - accidental or deliberate – (such as the creation of an acidic environment) in conjunction with other occurrences (such as freak meteorological conditions) might seem so low that they are not worth planning for. However, 'perfect storms' do occur, as was seen with the unlikely combination of risk factors at Fukushima in Japan.

Beyond the micro and macro risks outlined, primarily of a physical, sociopolitical or fiscal nature, there was also mention of the psychological risks associated with burying $CO_2$, or metaphorically 'sweeping it under the carpet'. How much damage are we doing to ourselves by internalising the knowledge that we are hiding $CO_2$ out of view In the same way that buried personal emotional issues tend to resurface with upset (until acknowledged, processed and resolved); so burying rather than dealing with the cause of excessive $CO_2$ may be damaging to our collective psychological wellbeing. How this sort of risk might be assessed would be a question perhaps not usually encountered by the Health and Safety Executive or other agencies.

*Recommendation:*

1. Complete a wide-ranging and thorough risk analysis to evaluate what possible eventualities are high- and low-risk and from this compile a comprehensive disaster management plan.

**5. Is it good for Scotland? What is the *real* motivation? (jobs, skills, economy, carbon reduction, international profile etc.) Is it good for the rest of the world? Is it viable in the rest of the world?**

As previously stated in this report, group perceptions varied as to whether or not CCS is a good thing for Scotland or indeed good *per se*. In terms of why CCS might be good for Scotland, the group identified several arguments. One clear advantage is the potential for economic benefits and job creation. Another benefit could be the potential to draw on existing academic and industrial expertise in Scotland, especially from the oil and gas industry. This could give Scotland the opportunity to export CCS to other countries, for example by exporting technology, consultants and experts, or helping to build power plants, pipelines and storage capacity.

A similar parallel might be seen in the case of Scotland (in particular Aberdeen) with the oil and

gas industry. Whilst the oil and gas industry was originally run out of Houston in the USA, Aberdeen now transfers skills and ideas back out as a result of the North Sea oil boom. As the oil and gas industry declines, there is perhaps a chance for Scotland to follow the same path with CCS. If CCS passes the safety case, Scotland could itself also be a major storer of $CO_2$, with profits to come from importing and storing $CO_2$. Finally, there is the possibility for CCS to put Scotland 'on the map' or even act as a source of pride. It could raise the profile of Scotland as a CCS leader within the UK.

The group also questioned, however, what the *real* motivation for doing CCS might be. It could be seen as a seductive solution, one that appeals to politicians as it can help to achieve Scotland's targets for carbon emission reductions, provide jobs and opportunities and make the country a world leader in the field. There is also the possibility that CCS could be seen as a 'quick fix' that allows for emission reductions without a change in mindset, however this is perhaps too much of an over-simplification. Given that storage in Scotland is planned to be offshore, there might also be the idea that there would be less public opposition due to the offshore nature of the storage (as opposed to onshore storage in, say, the Netherlands and Germany which has been met with fierce public opposition). Above all, CCS could be seen as a 'vote winner', in that it may be perceived as 'ticking the boxes' of job creation, energy security and allowing living standards to be maintained.

To return to the question of whether CCS is a good thing for Scotland, it is also important to think about why CCS might *not* be a good thing for Scotland. A number of group members felt that they just do not know whether CCS will be a good thing or not, as the assessment of the risks associated with CCS is an ongoing process that still needs to be carried out fully.

If CCS were to reduce the motivation to become more energy efficient, this could be a bad thing for Scotland. In terms of infrastructure, there is concern that CCS could leave a legacy similar to the legacy left in many cities and countries by the Olympic Games. That is, a legacy of debt, unused facilities and unnecessary or useless infrastructure. The group also had some concerns about whether the institutions and organisations behind CCS will really be good for Scotland – there is not enough public engagement, so industry is at the foreground of CCS discussions. The group believed that there will naturally be vested interests (for example industry) involved in the CCS process.

Lastly, there is some concern over who owns the water and land in which $CO_2$ will be stored. Offshore waters are owned by the Crown Estate, not Scotland, an issue that would be further complicated if Scotland were to gain independence from the rest of the UK in 2014. The concern here is that profit would flow to the Crown Estate and not Scotland, leaving Scotland as a dumping ground for the rest of Europe's $CO_2$ without any financial reward. It must be remembered, however, that there could still be significant economic benefit from the people and industries working onshore in Scotland, regardless of the offshore land ownership situation.

Outside of Scotland, is CCS good for the rest of the world? First and foremost, if CCS reduces Scotland's $CO_2$ emissions then this means that global $CO_2$ emissions are reduced. There is also the possibility that the export of CCS technology from Scotland to other countries could allow their low-carbon energy to take off – the end result being that global climate change is mitigated. The majority of the group believed that the world needs CCS as part of a range of options to mitigate climate change, however in this is the proviso that CCS does not stall people's pro-environmental behaviours. In other words, we need to make sure that emitting and storing $CO_2$ does not stop

people from taking actions to reduce their environmental impact in the first place.

Finally, there is the chance that carbon storage in the geologically suitable areas under Scotland's seas could benefit the whole world. There are other counties that have their own high-carbon industries but are in unsuitable geological areas. These nations still have their own $CO_2$ problems and targets to meet, so again if Scotland could store the $CO_2$ of other nations there is the potential for the global $CO_2$ level to be managed.

It is worth noting here that although the group received a lot of information on the role of CCS at the global level and at the Scottish level, we have not really spoken about whether or not CCS is a good thing for the Moray area. Given that the Moray area has suitable geology for carbon storage, and thus that there is the possibility for CCS to be happening here, it would be essential for a CCS project to be discussed at the local level.

**6. How do we ensure the public are involved in climate change mitigation decisions and actions? Is public opinion really acted on? How do we ensure representatives of civil society organisations are involved in a positive manner?**

We believe that it is important for governments and policy makers to fully involve the public in climate change mitigation decisions and actions, and to take seriously the views of the public. This is important because the effects of climate change will be felt by everybody, and therefore as previously stated it is imperative that we take action to mitigate climate change. In addition, the policies and mechanisms that are implemented to reduce carbon emissions will affect us all. Every one of us needs to be involved in this collective change in order to make it happen.

In order to meaningfully involve the public in decision making, we believe that public consultation should happen early in the planning process. This will give the public the chance to help develop policy, rather than simply consider existing plans. This consultation should be genuine, in that the results are listened to and considered. There should also be a feedback mechanism so that the public can see how the results of the consultation have been incorporated into the decision making process. We recommend that readers of the report provide feedback to the project team and the group, through the contact details at the end of the report.

The public are often cynical of the planning process as there is a lack of trust in the decision-making system and the information that they are provided with. In order to overcome this, the public needs to be able to believe the information that they are provided with, and to trust that this information is provided in good faith. One way to address this could be information provision from a variety of sources, e.g. government, non-governmental organisations, charitable trusts, international organisations, etc. This is a two-way process and policy makers need to respect the public, listen to their opinions, and trust that they are provided in good faith.

There are new technologies in development now that will not be available for several years, such as some of the novel use of $CO_2$ technologies mentioned above. Consultation on the use of these technologies should begin now, and not when it comes time to deploying them.

In order to engage the public and get them interested in the consultation process it is necessary to make the issue relevant and personal to the public, as the public will often only take an interest in an issue when it becomes personal to them. There must also be more opportunities for the public to engage in the debate.

In order to raise awareness of the issue we would welcome a series of advertising campaigns highlighting the issue and encouraging us all to get involved. These campaigns could build on the success of previous campaigns that have increased recycling. We would also welcome storylines in well-known national soap operas that deal with climate change, CCS, and public consultation on these issues. It is also important to get school children involved in the discussion.

We think that there is a very delicate balance to be struck between civil freedom and a 'nanny state'. On the whole we would welcome more legislation from government to outlaw environmentally-damaging behaviours, such as using incandescent light bulbs; in the same way that legislation previously outlawed unsafe behaviour such as driving without seatbelts. However, we are also cautious of government imposing itself upon the public. Consultation is key to striking this balance appropriately.

We further recognise that there is a balance between policy makers pulling an unenthusiastic public forward towards a low carbon future, and the public pushing a traditional establishment away from the status quo and into a different future. Again consultation is central to this balance.

One possibility for ensuring as wide a range of perspectives as possible are drawn in to the discussion could be something similar to the focus conference. This could involve different sections of the public, decision makers, civil society representatives and those coming from a more spiritual angle. Key in this would be to share viewpoints and make sure different stakeholders are aware of the ideas of others.

*Recommendations:*

1. Organise a Focus Conference which brings together Government, NGOs, civil society, spiritual organisations etc. to share and hear each other.
2. A series of advertising campaigns aimed at engaging the public on climate change and encouraging carbon mitigation activities and behaviour.

**7. What about the roles of world governments /institutions /organisations in changing behaviour? Is there the will to share knowledge and experience?**

If we pursue CCS, will it be embraced worldwide? The group cannot answer this question but the intention is that it should be.

The group believes that the EU holds an overview beyond ordinary party and national politics and needs to step up as a good example of how to listen to different groups' perspectives, and how to provide high quality, 'neutral' information. We felt that it is important for the EU (including the Commission, Parliament, etc.) to be collecting and monitoring public opinion on CCS but also on other carbon reduction technologies through focus groups, public forums, etc. in order to inform policy decisions. One instrument that could be used for this purpose is the EuroBarometer survey, though we did not agree on the 'appropriate factors' which needed to be measured consistently throughout the EU. Since we do not believe that the problem of climate change and carbon reduction can be solved by technologies such as CCS alone, and that wider social change is required for this purpose, we recommend that each member state set targets for investment into social research on behavioural change. Public behaviour needs to change significantly before climate change becomes irreversible.

The current interest in public consultation and engagement appears to stem from the failures of the proposed CCS demonstration project at Barendrecht in the Netherlands several years ago. The EU and member state governments seem now to be recognising, rather late in the day, the need to listen to and engage with the public. It came as a surprise to many of us that the Scottish Government developed a CCS Roadmap three years ago, but apparently with no public consultation or discussion. What with the Government's plans and priorities, this gives the impression that CCS in Scotland is a *fait accompli*, in which case what is the purpose of public engagement – just to rubber-stamp the existing strategy?

We recommend that, in the future, public engagement needs to be built-in to CCS project development from the start – and not just CCS but also other low carbon technologies. In tandem to this, a proactive strategy to disseminating information to the public and stakeholders needs to be developed.

A related issue is the sharing of knowledge and experience. This appears to occur only where the research is publicly-funded, and not when privately-funded. Intellectual property rights and the commercially sensitive know-how of companies appear to limit the sharing of information on CCS that is being funded by companies. We feel that where CCS research, development and demonstration is being wholly or mostly publicly-funded, then there should be an obligation for the findings and information obtained to be made available in the public domain. At the minimum, the public should be consulted about whether they would like such information to be shared and how.

A further role, identified by some participants, was for governments to ensure that funding is ring-fenced for continuing CCS research, development and demonstration. A key dimension of this is also effective project monitoring, review and evaluation. As part of its general role, Government also needs to review its climate change and carbon reduction targets in response to new information.

A specific role for the EU and its Member State Governments relates to the EU Emissions Trading Scheme (EU ETS). The initial phases of the EU ETS have been mired in politics with over-allocation of allowances and the recent collapse of the carbon price. This is counter to the overall objectives of the EU ETS to cap carbon emissions and provide strong incentives for carbon reduction through a high carbon price. The EU institutions now need to work to ensure that the EU ETS actually functions as it is supposed to.

Finally, there needs to be more emphasis on cooperation and sharing – information, standards, expertise, know-how, knowledge, information about major projects, etc. While there are some international bodies undertaking this already (e.g. Global CCS Institute) it is not obvious that they are entirely neutral and cooperating to the extent that is desirable.

*Recommendations:*

1. These types of consultative and deliberative processes should be continued as CCS and other low-carbon projects are further developed. Support should be given to further extend the public communication and dialogue to the wider community, e.g. help in setting up exhibitions, public talks, etc.
2. A joint meeting should be held with the Climate Change Committee of the Parliament involving members of the group and MSPs and officials.

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## 4.8 Information meeting

An information meeting to present the results of the focus conference will be held on the 6th September 2012 at Elgin Town Hall. The meeting has been organised in association with the Moray County Council and also involves the Moray Firth Partnership. Several of the focus conference participants will make short presentations on key findings in their report. Furthermore, a number of local Councillors have agreed to participate at the event.

# 5 Discussion

In this chapter, we will first summarize the key messages of the positioning papers (5.1). Then, based on the present research experience, we will discuss requirements for and expected impacts of focus conferences as a tool for public awareness raising and opinion formation (5.2), followed by a conclusion (5.3).

## 5.1 Local public perspectives on CCS: Key messages

In this section, we will only briefly compare the Polish and Scottish positions on CCS. We feel that we would not do justice to the participants' efforts by extensively repeating their key points below. Instead, we refer to the positioning papers in which the citizens have stated their opinion in their own words. To the extent we repeat or paraphrase these opinions below, it is merely to illustrate and integrate some points we have seen before and we feel are important to highlight to the reader. Readers who take interest in these points are strongly encouraged to refer to citizens' own wording of the issues, these being more extensive and accurate than our repetition thereof.

The positions can be summarized as follows. In Scotland, the participants' most important condition seemed to be that CCS should only be developed as part of a suite of options. In the Scottish group, 5 participants stated to want CCS along with other measures; 2 participants prefer other measures over CCS; 3 are undecided about CCS, and 1 participant abstained from voting. Most of the Scottish participants thus only think CCS it is worth pursuing, if at all, when combined with other strategies of combatting climate change. More specifically, most of them think that CCS should be developed on a parallel track with renewable energies. In Poland, the majority of the group (11) agreed that there are too many uncertainties to opt for CCS. There are too many open questions regarding risks, benefits to the region, costs, and the unclear position of the government. The remaining participants (5) were against local application of CCS. In all, the Polish participants think that at present, CCS is generally too costly to invest in and that locally there are too many uncertainties to justify a project that lacks a clear local benefit.

A difference between both groups was the focus on national advantages and disadvantages of CCS (Scotland) versus local advantages and disadvantages of CCS (Poland). The discussion at the Scottish site ended up to be more about national and international CCS, and the group did not fully cover the issue of storage in the Moray Firth and the impacts this would have on the local area. There was request from one participant for more discussion of local CCS projects, but this was hard to respond to because of the planning decision we took at the start not to discuss plans for real projects (see Paragraph 4.1). We will return to this point in the next paragraph.

Below are the key messages from the positioning papers in cursive, with explanations added.

*Agreeing that climate change happens and that measures should be taken does not imply agreement on CCS as a suitable method to curb climate change.* As already demonstrated in D8.1 (Brunsting et al, 2011a) climate change is generally not among the main issues of concern in local areas. Other issues, such as the unemployment rate, matter much more to the local public. This must be kept in mind when discussing CCS, or any other technology to tackle climate change. Although eventually climate change is the only justification for CCS, the technology has other short-term and mid-term benefits that could be significant for implementation. Furthermore, the participants in both groups mentioned that if CCS is to be effective against climate change, it is not enough to introduce this technology only in Scotland or in Poland. Its application should be worldwide.

*Acceptability of CCS is related to other measures to combat climate change.* After the information they received both groups in majority agreed that they preferred other measures to combat climate change than CCS. Furthermore, albeit more explicitly in the Scottish than in the Polish group, both agreed that if CCS is to be used it should be a short-term solution implemented along with an exit strategy as to not divert attention from other options which are perceived to be more sustainable in the long-term such as renewable energy.

*Pay attention to national and local advantages and disadvantages.* On a national level there may be benefits such as the further use of coal, which is the main argument in Poland, or the country taking a leading role in developing the technology, which was raised as an opportunity in both countries. The Polish participants mentioned that the introduction of the technology could lead to increased influence of Poland on the European policy for climate protection. However they could also think of international downsides such as becoming a "garbage dump" for European $CO_2$ emissions. To the Polish group, therefore, one of the conditions for accepting a local CCS project was that only $CO_2$ produced in the region would be stored. In contrast, Scottish participants discussed a possible role for Scotland as a main store of imported $CO_2$. Nationally as well as locally, employment can be an issue. In Scotland, the prospects for $CO_2$-enhanced oil recovery in the North Sea were of interest for some in maintaining employment in the off-shore sector, particularly if the tax rate could be adjusted to incentivise. Attention should also be paid to possible local disadvantages. In Poland, location of the storage site raises concerns with the participants about possible loss of value of surrounding real estate (buildings and land).

*Pay attention to risks and uncertainties.* Regarding the acceptability of risk, both groups discussed the 'unknowns' of CCS and the reliability of information available on risks. Among the Polish group, the acceptability of risks gained weight in the discussion when it became clear that a CCS project would have little if any direct benefits to the region. Along with the costs of CCS, the presence of too many uncertainties was the main reason for the Polish participants not to opt for CCS.

*National and European governments should clarify their role/position.* The participants were also explicit in their view on the role of National governments and the European government in developing a vision and stimulating public involvement in decision-making on solutions to climate change. The Scottish participants stated that it CCS is to be developed further, they would like to see a variety of regulations or conditions to the development. The government is not entirely trusted on viewing CCS as part of a long-term strategy for curbing climate change instead of being just a "quick fix" to get them out of the problem of needing deep carbon cuts to meet Government targets. Regarding the regulation of safety, both groups stated that it should be made clear with whom the responsibility for the project lies. The Polish participants mentioned that the government should also financially support the development of CCS and generally should clarify its role. Clear legislation on CCS should be provided. Here we quote the Scottish group:

*"Thus far, industry liability has been spoken about in terms of thirty years post last injection to a site (with liability transferring to government, and therefore the public purse, thereafter). However, this figure of thirty years, whilst commonplace in business planning, is insignificant in geological terms, and in terms of the amount of time for significant chemical and structural changes to become apparent."*

*Citizens expect public communication and participation activities.* Both groups agree that for effective public engagement, information campaigns on CCS are needed. Moreover both groups mentioned that the public should not just be informed about CCS, but also about alternative solutions to reduce $CO_2$ emissions into the atmosphere such as renewable energy. The Polish participants

proposed a referendum to let the citizens decide if their want a project in the area or not. The Scottish participants recommended public engagement to be built-in to project development from the start. Not just for CCS but also for other low carbon technologies.

## 5.2 Requirements and impact of focus conferences

Key components to successful focus conferences are that (1) (a selection of) the local citizens get the opportunity to obtain information about possibilities for plans in the region; (2) in a very early stage, so that (3) the citizens really have the opportunity to make suggestions for optimising any future decision-making about the technology from a local, social perspective, and thereby feel (4) listened to, involved, and empowered.

The focus conferences seem to have met the first three components in both Poland and Scotland. Firstly, professional recruitment firms recruited a varied sample of 11-16 citizens from the local area ensuring as many different perspectives from the local public as possible. Secondly, as it is yet uncertain if actual projects will ever be developed at both sites, involvement at this stage leaves room for citizens' views to be truly taken into account. Thirdly, both groups indicated to be positive about the process of the focus conferences and about the idea that the public was consulted in such an extended and involved manner. They were generally very interested in the topic and highly motivated to discuss. Fourthly, after the event they reported to feel listened to and involved. Many participants mentioned that they want to stay informed and involved in further activities on CCS.

However, some questions remain regarding the duration of these effects and their applicability to a real project setting. One of the main critiques on 'public engagement' in the literature is that it is often a one-off intervention that satisfies funders and researchers, but does not provide a long-term institutional capacity building, or acceptance by policy makers, of engagement (Lovbrand et al, 2011; Wynne, 2006; Wickson et al, 2010). Public engagement efforts are ultimately only effective if they make citizens feel listened to, involved, and empowered. In a real project setting, this can only be achieved if the citizens' suggestions are taken seriously and are truly taken into account in decisions regarding the project as well as in general policy making. However, within the boundaries of this project it is difficult if not outright impossible to make a reliable prediction about the extent to which public involvement will actually happen if a real project is ever to develop at one of the sites.

Regarding the duration of effects of the focus conference on public attitudes and empowerment, the participants have indicated they wish to stay involved but it is hard to foresee how long this commitment will last and how their attitude will develop. Within the scope of the SiteChar project, information meetings have been planned at both sites as a follow-up to the focus conferences which will give at least some indication of endurance of involvement. Furthermore, as part of the European project ECO2[2], in-depth post-hoc interviews with the focus conference participants will be conducted to see what they think of the event in retrospect. However, testing enduring achievement of each of the abovementioned components is beyond the scope of the project.

It is at present highly uncertain if projects will ever develop in the regions. In the Scottish focus conference, Shell was involved to represent the industry perspective because they are developer of Goldeneye – the most likely offshore $CO_2$ storage site to be developed. However no company has proposed a $CO_2$ storage site in the Inner Moray Firth – the area of sea adjacent to Moray.

[2] http://www.eco2-project.eu/

Instead, a representative of the Scottish Government attended to present the governmental view on CCS. At the Polish site it is already known who the project developer will be in case technical site characterisation indicate favourable circumstances for CCS and if the company can develop a business case for the project. This is PGNiG, who also participated in the focus conference. The presence of the project developer as well as the site being onshore and easier to locate may made it possible in Poland to discuss local application of CCS. However, here too, the question whether an actual project will ever happen is as open as it is in Scotland. That said, if a project would ever be developed at these or other sites, we recommend taking into account the following issues when organizing a focus conference or a similar event:

*Ensure trust in the facilitators and allow time to create a safe environment.* Whereas differences may exist in the setup of the event and information or presentation materials used, key to the opinion formation process appears to be trust in the neutrality of the organizers and the creation of a safe environment. This takes time, which should be taken into account when planning focus conferences in a real project setting. Facilitators of such an event should be selected carefully. Within the SiteChar project, it was easy to convince the participants of our neutrality because the facilitators were social researchers who worked independently from companies and were paid by EU funding. In practice, this will be more challenging. Given the importance of neutrality and the highly specialized skills needed to moderate this type of discussions with citizens, it may be recommendable to use the services of independent facilitators.

*Embed focus conferences in a range of public engagement activities.* Instead of viewing them as a one-off event a focus conference should be seen as the start of a process of enhanced cooperation in planning of new storage sites between project developers, authorities and the local public. Once the project team has started to engage the local public this way, an obligation is created to keep the local public informed about and involved with further steps in the project planning. Furthermore, focus conferences cannot be used to obtain a citizen's view that is representative for the community.

*Do not extrapolate findings from small group research to communities.* Trying to quantify opinions of small groups and extrapolating these to the community is likely to result in very unreliable conclusions. If the team finds it important to know how widespread particular public concerns or misconceptions are within the local community, techniques involving a large, representative sample of participants from that community should be chosen instead of focus conferences. Representativeness can never be attained with small numbers and obtaining representative opinions is thus not the aim of a focus conference. Focus conferences are meant to obtain an impression of the directions in which the local public debate could develop when a real $CO_2$ storage project is pending. It has to be noted that the Scottish focus conference included 4 participants who were involved in the Findhorn Foundation. To improve representativeness we could have excluded these people from the group, but this would probably have led to a less rich process and outcome. Without their involvement, the positioning paper might not have been so comprehensive and accomplished. Furthermore, these participants were not 'elite' people or influential in policy making and thereby still representative of 'ordinary' citizens in terms of power.

*Balance positions taken by speakers and in discussion materials.* When organizing a focus conference it is recommended to devote substantial time and resources to the selection of speakers and discussion materials. Regarding speakers, it is important to have all key perspectives represented for the sake of balance in the discussion. The aim of the presentations was to present and discuss all dominant stakeholder perspectives on CCS: the scientific view, the project developer's view, the governmental view, and the NGO view. To this end, both focus conferences invited sci-

entists to present on technical and geological aspects of CCS, a national government representative to present the governmental view on CCS, an industry representative to present the industry view on CCS, and an NGO to present the NGO's position towards CCS. This aim was almost achieved, with one exception. At the Scottish site, due to limited resources, we were unsuccessful in our attempts to get an expert speaker from an NGO from the region. Several were approached, but none were able to attend the focus conference. Focus conference participants in the Scottish indicated they would have enjoyed a speaker with a more environmental NGO perspective, but they also noted that on the whole they perceived the information they received as balanced. Needless to say that presentations should be understandable and not too long.

Balance is also important when using other materials such as film. We have experienced that people do not appreciate one-sided discussion materials unless they are accompanied by materials presenting the opposite view. In Scotland, at the end of the first day, the participants watched the film "An inconvenient truth" by Al Gore. Whereas it was part of the social evening program and did not intend to inform people objectively about climate change, the film was not a great success because participants did not like its rather dramatic style of presentation and argumentation as well as its strongly one-sided opinion. In Poland, at the start of the second day, participants watched the film "Introducting $CO_2$ capture and storage" developed by researchers in the Near$CO_2$ project (Upham et al, 2010). Designed as a focus group discussion aid, this 15-minute film aims to offer a balanced view on CCS and is interrupted with on-screen questions for the group to discuss. This film was meant to introduce people to the topic of CCS. To this end, the facilitators at the Scottish focus conference showed a short film made by the university of Edinburgh entitled "Talking Heads" which aimed to 'humanise' CCS by showing a wide range of people from the university doing CCS research. This film, too, was very effective in stirring a lively discussion.

Finally, people appreciate the opportunity to experience the technology as this makes information provision more interactive. Therefore, in both focus conferences, participants could do experiments with $CO_2$. In the second weekend, the Polish participants went on an excursion to the gas mine where in the future $CO_2$ might be injected. As such an event was not possible in Scotland since the field is far offshore, the Scottish organizers opted for having more experiments as to give participants a hands-on experience with CCS as much as possible. This included a $CO_2$ 'bucket game' (carbon mitigation potential of a range of low-carbon energy technologies) and microscopes and slides of sandstone and other porous rocks suitable for $CO_2$ storage

Regarding wider applicability of focus conferences, they can be used for organizing public engagement and initiating co-operation in planning in a range of projects on local or regional level, such as wind farms and electricity infrastructures. The format may also be an interesting tool for getting the public's ideas on issues that are more individually-related, such as means for saving energy efficiency in households. For example, at the Scottish conference, participants mentioned that discussing CCS made them more conscious about other environmental issues as well and that they felt motivated to take action themselves and would like to know how.

Finally, we would like to point out some conditions under which focus conferences, or similar methodologies for public engagement, are not useful. Focus conferences are only constructive to a process of project development if people feel that the interest in their opinion is genuine. When applied to real projects aiming to initiate local discussions, it will be essential that the local public can witness that their opinion is truly part of the process of project development and decision-making. This implies a number of circumstances under which focus conferences would not be useful:

- If the project plans have taken shape and there is little or no room left for change
- If there is already a conflict between the local public and project initiators
- If there is no genuine interest in weighing local public opinion in the process of decision making, but if local public opinion is instead viewed as something to overcome.

## 5.3 Conclusion

The focus conference appears suitable for raising public awareness about complex issues such as CCS and to initiate local discussion and planning processes. For a long term effect in a real life project setting, however, it will be vital that outcomes of such efforts are also related to national policy agendas and priorities. The focus conference in the applied design is suitable for giving people the opportunity to form an informed opinion about CCS. Two weekends give plenty time for development of group dynamics and informed opinion, but do not lead to boredom. In all, the current length appears fit for the task of writing a positioning paper. The positioning papers demonstrate that citizens are well capable of asking sharp questions and stating their opinions with very little guidance when given room to do so. The papers are a powerful demonstration of what may happen if project teams let citizens influence the conversation agenda and invite them to ask critical questions about CCS. It has been a great learning experience for the whole research team in WP8 of the SiteChar project.

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# Appendix I. Recruitment of Polish Participants

At the beginning of the project we planned to recruit the participants ourselves, but because of administrative difficulties and lack of time we decided to assign a professional market research firm, TNS OBOP based in Warsaw. UfU provided following recruitment guidelines to the market research firm:

Event: focus conference will be organised by Independent Institute for Environmental Issues and will take place on 2 weekends, 30-31 March (1,5 days, from 12.00 on Friday till 16.00 on Saturday) and 20-22 April 2012 (2,5 days, from 12.00 Friday till 16.00 on Sunday) in Pakosław Palace (municipality Pakosław in powiat Rawicz). The topic of the conference will be climate protection and carbon capture and storage technology. 16 participants will have the opportunity to discuss the technology with each other and with experts and state their opinion, which will be written down in a statement which will be used to inform policy makers and project developers. The conference is a part of European SiteChar project which is a research program dedicated to improving the characterisation of sites for the geological storage of $CO_2$. The main funding for this project comes from the European Commission.

Participants: 16 people, representative sample from municipalities Góra, Wąsosz, Niechlów, Jemielno, Rawicz and Bojanowo (see Table 5 for the guidelines and Table 6 for the result); socio-demographic criteria: equal shares of males/females, representatives of all age groups (correspond to the demographic situation in the area), different professions and levels of qualification. An important precondition for the participating is the presence on both weekends of the conference.

Other: The organiser will bear the costs for the accommodation, meals and travelling.

*Table 5* Guidelines for the representative sample

| Municipality | Number of inhabitants* | % | Numer of participants |
|---|---|---|---|
| Góra | 20726 | 27,6 | 4 |
| Jemielno | 3074 | 4,1 | 1 |
| Niechlów | 5090 | 6,8 | 1 |
| Wąsosz | 7366 | 9,8 | 2 |
| Bojanowo | 8913 | 11,8 | 2 |
| Rawicz | 30007 | 39,9 | 6 |
| **Total** | **75176** | **100** | **16** |

* Status: 31.12.2010 (GUS)

*Table 6* Information about the participants

| Municipality | Gender | Age | Profession |
|---|---|---|---|
| Bojanowo | f | 65 | pensioner |
| Góra | f | 24 | shop assistant |
| Góra | f | 24 | farmer |
| Góra | f | 45 | housewife |
| Góra | m | 45 | pensioner |
| Góra | m | 51 | construction worker |
| Jemielno | f | 53 | official |
| Niechlów | m | 46 | pensioner |
| Niechlów | m | 51 | village administrator |
| Rawicz | f | 21 | student |
| Rawicz | f | 25 | teacher |
| Rawicz | m | 29 | worker |
| Rawicz | m | 31 | fitter |
| Rawicz | m | 49 | pharmacist |
| Rawicz | m | 62 | car mechanic |
| Wąsosz | f | 33 | teacher |

# Appendix II. Polish Time schedule

## A II.1 Weekend 1, Day 1: Friday, 30 March 2012

| Time | Process | Speaker |
|---|---|---|
| 10:00 - 11:45 | Check-in<br>Interviews with participants | |
| 12:00<br>(60 min) | Lunch | |
| 13:00 - 13:10 | Greeting | Marta Kaiser (UfU) |
| 13:10 - 13:20 | Team and project introduction | Marta Kaiser |
| 13:20 - 13:40 | Game: “get to know” bingo | Krzysztof Lootze (UfU) |
| 13:40 - 14:10 | Presentation:<br>Method “Focus conference” and positioning paper | Marta Kaiser |
| 14:10 - 15:00 | Associations round about $CO_2$ | |
| 15:00<br>(30 min) | Coffee break | |
| 15:30 – 17:00 | Expert presentation:<br>Introduction to the CCS technology<br>+ discussion with the participants | Czesław Rybicki, D.Sc.<br>AGH University of Science and Technology |
| 17:00 - 17:30 | Feedback round<br>CCS Association round | |
| 17:30 - 18:00 | Experts for the next day | |
| 18:00<br>(90 min) | Dinner | |
| 19:30<br>(60 min) | Experiments with $CO_2$ | |

## A II.2 Weekend 1, Day 2: Saturday, 31 March 2012

| Time | Process | Speaker |
|---|---|---|
| 08:00 - 09:30 (90 min) | Breakfast | |
| 09:30 - 09:45 | Warm-up round | |
| 09:45 - 10:00 | Short film: „Introduction $CO_2$ capture and storage“ from Near$CO_2$ project | |
| 10:00 - 11:30 | Expert presentation:<br>CCS in Europe and in Poland<br>+ discussion with the participants | Agata Hinc<br>demosEUROPA<br>Centre of the Euro-pean Strategy |
| 12:00 (60 min) | Lunch | |
| 13:00 - 14:00 | World café<br>Small-group work about the chances, risks and potentials of CCS | |
| 14:00 - 14:45 | Presentation of the discussion results | Participants |
| 14:45 - 15:00 | Feedback round | |
| 15:15 | Farewell of the participants | |

## A II.3 Weekend 2, Day 1: Friday 20 April 2012

| Time | Process | Speaker |
|---|---|---|
| 09:45 - 11:45 | Check in<br>Interviews with participants | |
| 12:00<br>(60 min) | Lunch | |
| 13:00 - 13:10 | Welcome<br>Review | Marta Kaiser |
| 13:10 - 15:00 | Role-playing game<br>4 groups (local government, industry, EN-GOs, citizens) | |
| 15:00 - 16:00 | Expert presentation:<br>The government position towards CCS<br>+ discussion with the participants | Elżbieta Wróblewska Ministry of Economy |
| 16:00<br>(20 min) | Coffee break | |
| 16:20 - 17:20 | Expert presentation:<br>The NGO's position towards CCS<br>+ discussion with the participants | Kuba Gogolewski Bankwatch Network/ Polish Green Network |
| 17:20 - 18:20 | Expert presentation:<br>The position of Polish Geological Institute (research) towards CCS<br>+ discussion with the participants | Wojciech Wołkowicz, Ph.D.<br>Polish Geological Institute |
| 18:20 - 18:40 | Group photo | |
| 18:40 - 19:10 | Feedback round | |
| 19:30 | Dinner | |

## A II.4 Weekend 2, Day 2: Saturday 21 April 2012

| Time | Process | Speaker |
|---|---|---|
| 08:00 - 09:30 (90 min) | Breakfast | |
| 09:30 - 09:45 | Warm-up | |
| 09:45 - 10:30 | Positioning toward CCS (4 questions) | |
| 10:30 - 11:15 | Expert presentation: The position of PGNiG towards CCS + discussion with the participants | Grzegorz Sojski Polish Gas and Oil Company (PGNiG) |
| 11:15 – 12:00 | Expert presentation: CCS in local dimension | Marcin Mazurowski PGNiG |
| 12:00 (60 min) | Lunch | |
| 13:00 – 15:00 (120 min) | Excursion to the gas mine Załęcze-Wiewierz | Józef Szurek Manager of the gas mine |
| 15:00 (30 min) | Coffee break | |
| 15:30 - 17:30 | Feedback round | |
| 17:30-18:00 | Editorial conference Discussion about the structure of the positioning paper | Marta Kaiser |
| 18:00 (60 min) | Dinner | |
| Up 19:30 | “Evening discussions” with experts | |

## A II.5 Weekend 2, Day 3: Sunday 22 April 2012

| Time | Process | Speaker |
|---|---|---|
| 8:00 - 09:00 (60 min) | Breakfast | |
| 09:00 - 09:15 | Warm-up | |
| 09:15 - 09:30 | Next steps | Marta Kaiser |
| 09:30 - 10:30 | Writing of the positioning paper in 3 small groups (without help) | |
| 10:30 (30 min) | Coffee break | |
| 11:00 - 12:00 | Text work in plenum I<br>Presentations (results from the small-group work)<br>Sentence pro sentence- accept the text | Participants |
| 12:00 (60 min) | Lunch | |
| 13:00 - 15:00 | Text work in plenum II | |
| 15:00 | Farewell of the participants | |

# Appendix III. Recruitment of Scottish Participants

The initial idea was to recruit the participants by writing letters to a sample of the Electoral Register. Because of doubts concerning whether a sufficiently good response rate would result from a cold invitation letter, it was then decided to use a professional recruitment agency. The recruitment guidelines provided by the project partners to the agency are shown below:

Event: We are organizing a so-called 'focus conference' that will take place on 2 weekends, the first one 30/31 March and the second one 20/22 April. The topic of this conference will be a new technology to prevent climate change called 'carbon capture and storage'. A sample of 16 participants from the local community will discuss the technology with experts based on information and presentations given by these experts. The hosting will be done by ourselves. The event is part of an international research program (EU funded) and we are running exactly the same event on the same dates in Poland.

Participants: We are looking for 16 people from the Moray Firth region (see map attached) who are willing to participate in both weekends. The profile we are looking for is: equal shares of males/females, mixed in terms of age and socio-economic status. We do realize that it's quite a large area to sample 16 people from and, depending on where the event will be held, the location may be far away/hard to reach by some people. Alternatively, we could opt for recruiting people within a particular radius around the venue. This will also reduce travel expenses.

Other: We will probably have to discuss what to tell prospective participants about the event? They are entitled to know that it's about carbon capture and storage, energy technology and climate change, but we do not want to inform them extensively up front to avoid any bias.

Recruitment resulted in a sample in which the following occupations were represented:

- Assets Manager/factor for charity
- Social Worker, CQSW
- Business Manager, degree and post grad.
- p/t shop asst/cleaner
- Deli owner
- Carer
- Retired Airport Director, responsible for 300 plus staff
- Retired Electrical Engineer, AMIEE
- Retired Shipwright
- Retired Documentary Film Maker and Reflexologist
- Hotel manager
- Barman
- Health & Safety Advisor
- Publican, responsible for 3 staff

# Appendix IV. Scottish time schedules

## A IV.1 Weekend 1, Day 1: Friday, 30 March 2012

| Time | Process | Speaker |
|---|---|---|
| 11.30 | Check in | Leslie / Rhys (SCCS) |
| 12:00 (60 min) | Lunch | |
| 13:00 (10 min) | Greeting<br>Team introduction | Leslie |
| 13:10 (10 min) | Project introduction | Rhys |
| 13:20 (20 min) | Game: “get to know“ bingo | Rhys |
| 13:40 (10 min) | Presentation<br>Method „Focus conference“ – protocol and guidelines | Mariette (ECN) |
| 13:50 (60 min) | Discussion in small groups on quality of life, things they like and don’t like about where they live, environmental attitudes, etc. | Leslie |
| 15:00 (30 min) | Coffee break | |
| 15:30 (90 min) | Expert: Introduction to the CCS technology<br>+ discussion with the participants | Dr Stuart Gilfillan, Scottish Carbon Capture & Storage |
| 17:00 (30 min) | Feedback round from participants | Leslie |
| 17:30 (15 min) | Indication of day two + mention of positioning paper | Leslie |
| 18:00 | Dinner | |
| 20:00 (90 min) | FILM: An Inconvenient Truth | |

## A IV.2 Weekend 1, Day 2: Saturday, 31 March 2012

| Time | Process | Speaker |
|---|---|---|
| From 07:00 | Breakfast and Check out | |
| 09:15 (30 min) | Warm-up round: 2 Experiment stations | Simon (SCCS) |
| 09:45 (15 min) | Short film "Talking Heads" on CCS taken by Leslie within UoE – positive and negative views | Simon |
| 10:00 (20 mins) | Reflections | Simon |
| 10:20 (10 mins) | Coffee Break | |
| 10.30 (90 min) | Expert: CCS in Scotland and its possible impact in the oil field areas (presentation 25 min.) + discussion | Professor Alex Kemp, University of Aber-deen |
| 12:00 (60 min) | Lunch | |
| 13:00 (90 min) | World Café<br>Small-group work about the chances, risks and potentials of CCS. | Simon |
| 14:30 (15 mins) | Coffee Break | |
| 14:45 (30 mins) | Round the Room plus discussion | Simon |
| 15:15 (30 min) | Feedback on the First Weekend and looking ahead to second weekend: Experts, homework, report writing. | Simon |
| 15:45 | Farewell of the participants | |

## A IV.3 Weekend 2, Day 1: Friday, 20 April 2012

| Time | Process | Speaker |
|---|---|---|
| 11:30 | Check in + Experiments | Rhys |
| 12:00<br>(60 min) | Lunch + Experiments | |
| 13:00<br>(20 min) | Welcome + outline for the weekend | Simon |
| 13:20<br>(30 min) | Group discussion: reflections on past 3 weeks. | Rhys |
| 14:00<br>(90 min) | Expert: The government position towards CCS (30min presentation) + discussion with the participants | Stuart McKay, Scottish Government |
| 15:30<br>(30 min) | Coffee break | |
| 16:00<br>(90 min) | Expert: Industry position towards CCS (30min presentation) + discussion with the participants | Paul Wood, Shell |
| 17:30<br>(60 min) | Identify key Questions<br>Working from key issues from 1st weekend. Group to decide on questions for the report. How will the report look? | Rhys |
| 18:30<br>(60 min) | Dinner | |
| 20:00<br>(60 mins) | Experiments | Rhys |

## A IV.4 Weekend 2, Day 2: Saturday, 21 April 2012

| Time | Process | Speaker |
|---|---|---|
| From 07:00 | Breakfast | |
| 09:15 (30 min) | Info session: Simon on alternative uses for $CO_2$ | Simon |
| 09:45 (15 min) | Explanation of the day and report writing process. | Simon |
| 10:00 (120 min) | Report Writing: Question 1 and 2 | |
| 12:00 (60 min) | Lunch | |
| 13:00 (120 min) | Report Writing: Question 3 and 4 | |
| 15:00 (30 min) | Coffee break | |
| 15:30 (60 min) | Beach Walk and Photo | |
| 16:30 (90 min) | Report Writing: Question 5 and 6 | |
| 18:00 (90 min) | Dinner | |
| 19:30 | Additional report writing + informal “Evening discussions” | |

## A IV.5 Weekend 2, Day 3: Sunday, 22 April 2012

| Time | Process | Speaker |
|---|---|---|
| From 7:00 | Breakfast | |
| 09:15 (75 min) | Review draft chapters Round 1 | |
| 10:30 (30 min) | Short break | |
| 11:00 (60 min) | Review draft chapters Round 2 | |
| 12:00 (60 min) | Lunch | |
| 13:00 (120 min) | Finalise Report | |
| 15:00 | Farewell | |