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International comparison of the large group process

Results from Canada, Netherlands, Scotland and Australia

Peta Ashworth, Talia Jeanneret, Karen Stenner and Liz Hobman
EP: 124934
June 2012

SUPPORTED BY
GLOBAL CCS INSTITUTE

Citation

Ashworth, P., Jeanneret, T., Stenner, K. & Hobman, E.V. (2012). International comparison of the large group process. Results from Canada, Netherlands, Scotland and Australia. CSIRO: Pullenvale

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Important disclaimer

Contents

Figures

Tables

Acknowledgments

CSIRO acknowledges the financial and other support provided by the Global CCS Institute.

CSIRO also acknowledges the contribution of our international collaborators on this project:

- Energy research Centre of the Netherlands (ECN) - S. Brunsting, B. van Bree, C.F.J. Feenstra and M. Hekkenberg
- University of Calgary – E. Einsiedel, A. Boyd and J. Medlock
- University of Edinburgh – R. Howell, S. Shackley and L. Mabon

Executive summary

The research presented in this report presents the results of a large group workshop process, developed in Australia (see Ashworth, Carr-Cornish, Boughen, & Thambimuthu, 2009), that was replicated across four different countries to engage a cross section of the community. The countries selected were chosen on the basis that carbon capture and storage (CCS), *a technology to prevent large amounts of carbon dioxide (CO_2) being released into the atmosphere from the use of fossil fuel in power generation and other industries* (www.globalccsinstitute.com) is being seriously considered as a mitigation option by governments in those countries and included the Netherlands, Scotland, Canada and Australia.

The main aims of the research were to:

- Explore the views of individuals on climate change and the range of energy technologies;
- Provide background information on climate change and energy technologies, and enable the opportunity for discussion with peers;
- Assess the impact of the information and the process on individual knowledge, attitudes and behaviours; and
- Assess individual views on the potential solutions for mitigation, including CCS, and how these views change as a result of the workshop.

In total 374 participants attended the workshops. The workshop in the Netherlands was attended by the highest number of participants (n=111), followed by Scotland (n=99), Canada (n=80) and Australia (n=84[1]). The gender distribution of participants in the Netherlands, Canada and Scotland was relatively even with males slightly over represented compared to the population statistics of the region. Due to a number of no shows in the Sydney workshop in Australia, the gender sample was skewed towards males.

Participants were most aware of CCS in the Netherlands (84%), Australia (77%) and then Canada (61%). Scotland had the lowest awareness of CCS with only 36% of workshop participants indicating they were aware of CCS. It is likely that the higher level of awareness in the Netherlands was associated with the controversial Barendrecht project and the consequential ruling by the Dutch government that no CCS projects would take place on shore in the Netherlands. The Australian sample was made up of representatives from the Southwest Hub flagship project local community, which was more likely to be aware of the project.

The results indicated that the workshop was successful in increasing participants' self-rated knowledge about CCS and the portfolio of energy technologies. As in previous research, there was strong support for renewable energy and concerns expressed over any investment in CCS at the expense of renewable energy development. It was also apparent that country context does impact on energy technology preferences. The samples in Australia and Canada – which export a large component of their fossil fuels – were more positive about the role of CCS compared to those in the Netherlands and Scotland.

The results suggest that the process was successful in gaining citizens' participation and investment in sharing information about energy issues, particularly evidenced by the increase in group identification over the course of the workshop. This seems to indicate, that little was lost by engaging up to 100 people in the room, rather than the normal dozen that would likely participate in a focus group. As such, the process has evident potential to be used to engage larger numbers within a local community about CCS, as it provides a way to access participants' opinions and allow them to feel that they have been heard. This is in contrast to the more traditional town hall style meeting, where only the loudest voices tend to be acknowledged and can have the greatest influence on the outcome.

[1] The Australian sample is a combination of two workshops: Sydney and Collie

1 Introduction

1.1 Background

The Global CCS Institute aims to accelerate the adoption of carbon capture and storage[2] (CCS) as a key solution in the portfolio of options for greenhouse gas mitigation and enhanced energy security (www.globalccsinstitute.com/institute). Based on the predictions of ongoing fossil fuels for many decades to come (IEA, 2009), it has been deemed critically important that CCS be considered as a mitigation option. There have been suggestions that the costs to achieve sought after climate stabilisation will be at least 70% higher if CCS is not widely deployed from 2020 (IEA, 2009). However, like all new technologies there are several uncertainties and perceived risks associated with it. As such, one of the critical success factors for successful deployment of CCS is societal acceptance. In their work in the renewable energy space, Wüstenhagen et al. (2007) describe three dimensions of societal acceptance: socio-political, community and market acceptance. All three are equally relevant to CCS.

The challenge and focus of this research, is to understand current public opinion about CCS and the factors that may influence community acceptance, which in turn help to inform the socio-political dimension. We utilise a large group workshop process, developed in Australia (see Ashworth, Carr-Cornish, et al., 2009), to engage a cross section of the community from four different countries: the Netherlands, Scotland, Canada and Australia. They were selected on the basis that CCS is being seriously considered as a mitigation option by governments in these countries.

The main aims of the research were to:

- Explore the views of individuals on climate change and the range of energy technologies;
- Provide background information on climate change and energy technologies, and enable the opportunity for discussion with peers;
- Assess the impact of the information and the process on individual knowledge, attitudes and behaviours; and
- Assess individual views on the potential solutions for mitigation, including CCS, and how these views change as a result of the workshop.

This report documents recent research in relation to public attitudes towards CCS[3] and then summarises the main findings arising from the workshops. The report details some of the factors that influenced participants' attitudes and considers the implications for further engagement on CCS across the world.

1.2 Recent research in CCS

Over the past decade there have been a number of studies conducted to understand public opinion and what may constitute public acceptance of CCS in various countries (Ashworth, Boughen, Mayhew, & Millar, 2009; de Best-Waldhober, Daamen, & Faaij, 2009; Huijts, Midden, & Meijnders, 2007; Huijts, Molin, & Steg,

[2] "CCS is a technology to prevent large quantities of carbon dioxide or CO_2 (a greenhouse gas) from being released into the atmosphere from the use of fossil fuel in power generation and other industries". Source: http://www.globalccsinstitute.com/ccs/what-is-ccs

[3] Brunsting, S., B. van Bree, C.F.J. Feenstra & M. Hekkenberg (2011), Public perceptions of low carbon energy technologies – Results from a Dutch large group workshop. Energy research Centre of the Netherlands, Netherlands.
Einsiedel , E., Boyd, A. & Medlock, J. (2011) Publics and Energy – Results from Calgary, Alberta (Canada) workshop. University of Calgary, Canada.
Howell, R., S. Shackley & L. Mabon (2012) Public perceptions to low carbon energy technologies – Results from a Scottish Large Group Workshop. University of Edinburgh, Scotland.
Jeanneret, T., P. Ashworth, L. Hobman and N. Boughen (2011) Results from Collie CCS Hub workshop: What do the local think? CSIRO, Australia.

2012; Itaoka, Okuda, Saito, & Akai, 2009). Huijts, Mollin and Steg (2012) define acceptance as behaviour that enables, supports or promotes an energy technology, in contrast to open and expressed resistance to it, while *acceptability* is an attitude or evaluative judgement towards an energy technology. The researchers also highlight a third category of *tolerance*, where people are in favour of a technology and do not take action against it.

Tolerance perhaps best characterises the most common status of societal acceptance of energy technologies to date. However, there are examples where local community opposition to deployment of specific energy projects, such as wind, nuclear, and biomass (Graham, Stephenson & Smith, 2009; Pickett, 2002; Upreti, 2004) have occurred. However, as issues of security of supply, carbon emissions, rising electricity prices and general increased accountability of governments intensify; decisions around the final portfolio of options for low carbon energy are likely to require increased levels of societal acceptance. Therefore, processes to engage communities in ways that enable them to become more informed about the technologies, while at the same time documenting their reactions to them, are likely to be preferred by industry, government, research and development organisations alike.

Carbon capture and storage is still relatively unknown compared to more established energy technologies such as wind, solar, coal fired power, and hydro electricity. However, awareness of the technology has grown over time, particularly in areas where CCS projects have been proposed, deployed or opposed. For example, the recent Special Eurobarometer 364, which examined public awareness and acceptance of CCS across 12 European countries[4] surveyed 13,091 European Union citizens (European Commission, 2011). Only 10% of respondents overall said they had heard of CCS and knew what it was, with a further 18% having heard of it without knowing what it was. Yet in the Netherlands, where there has been controversy associated with the Barendrecht CCS project, 52% indicated they knew what CCS was.

Again this in contrast to Canadian and Australian polls where, in a recent poll in Canada of 1,548 citizens, 14% had heard of CCS and knew what it was, while a further 30% had heard of CCS but did not know what it was (Insightrix Research Inc., 2011). In contrast, in an Australian survey conducted in June 2011 across a representative sample of 1,907 participants, 25% indicated they had no knowledge of gas or coal with CCS, while 22% indicated a moderate knowledge. Only 2% thought they had high knowledge of CCS, with 13% overall indicating more than moderate knowledge (Hobman et al., 2012).

However, given the generally low levels of knowledge of CCS, the validity of results from large scale surveys has been questioned, with findings sometimes purported to reflect “non-opinions” or “pseudo-opinions” at best (de Best-Waldhober, et al., 2009; Malone, Dooley, & Bradbury, 2010).In order to better understand public opinion towards CCS, social research has been undertaken in specific geographic locations where CCS projects have been proposed as public awareness about CCS is assumed to be higher in those locations when compared to society as a whole (Ashworth et al., 2008; Bradbury and Wade, 2010; Brunsting et al., 2011; Desbarats et al, 2011). From this research it has become apparent there are critical considerations affecting acceptance of CCS projects, including issues of trust in the project proponent (Terwel, Harinck, Ellemers, & Daamen, 2009, 2011), the alignment of governments to support a project (Ashworth et al., 2012), considerations of place attachment (Desbarats et al., 2011), and the social context surrounding the project (Bradbury, et al., 2009).

[4] Eurobarometer countries included Germany, United Kingdom, Italy, Spain, the Netherlands, Poland, Finland, France, Greece, the Czech Republic, Bulgaria and Romania.

2 Methodology

2.1 Recruitment

The four countries were tasked with recruiting up to 100 participants for their large group workshop. In the Netherlands, Scotland and Canada participants were recruited through an external recruitment agency with experience in recruiting for focus groups and opinion polls. The recruitment process described the workshop topic as climate change and low carbon energy technologies. The agency was required to ensure the sample was representative on at least gender and age.

The Australian large group included herein was not funded as part of this research. Participants for the Sydney workshop were recruited from a marketing database compiled from responses to an Australian Lifestyle Survey. Invitations to register for the workshop were sent via email to individuals based in postcodes within 200km of Sydney's CBD and aged over 18. The invitations were successfully delivered to 5,426 email addresses. Participants were referred to a CSIRO webpage that described the workshop as an opportunity to contribute views on a topic of national significance, and provided several examples on what this topic may be. The webpage provided a link to a registration page where participants could register their necessary contact details and demographic data. Participants were informed that they would be invited to the workshop based on their demographic information in order to obtain a representative sample. From the 194 people who registered, 130 were initially selected for participation based on their sex, age and education level, and invited to attend the workshop. However, due to a low number of responses to this initial approach, all original registrants were ultimately sent invitations. In total, 59 participants attended the workshop. Due to ethical requirements, the invitation to attend disclosed the workshop topic as climate change, energy, and low emission energy technologies which may have affected the final sample.

To ensure a larger Australian sample for adequate comparison with the other countries, the Sydney results were combined with those from the South West Hub CCS Project, which undertook the same process but involved fewer people, because it was conducted in a smaller country town. Participants for this workshop were recruited through a range of open invitations, advertisements placed in the local paper, and some community announcements on the radio.

2.2 Process

For each workshop, the large group process was kept as consistent as possible across countries, with only small changes made to suit the specific country context. The process evolved from earlier research that had found that small workshops of 8 – 10 people focusing on the topic of climate change and energy technologies successfully increased participant knowledge (Ashworth et al., 2009b). In order to reach more people the process was scaled to accommodate up to 100 people at once in the room, while still mimicking the small group process by retaining more intimate 'table groups' of up to ten participants within the larger room. A lead facilitator attended to the overall process to ensure the day ran to schedule, while each table was assigned its own facilitator to ensure equal participation in group discussions (Ashworth et al., 2009a).

A designated "expert" was used to communicate the science of climate change, the portfolio of options that may contribute to a low carbon energy supply, and then a specific focus on CCS. While the information presented was kept as consistent as possible across countries, each presentation deployed a local expert and adapted for the specific national context. Maintaining a consistent presentation across each country was considered important to control for differences in delivery. Using the same expert in each location would be ideal however, this was not practical given the cross sections of countries in the study. A key

hypothesis to be tested was that the level of trust participants have in 'their' expert would impact on reception and acceptance of the information.

The workshop process is outlined in Table 1, which highlights the focus of each activity. Attention was paid in the design and timing of the process to allow participants to develop a sense of identification with both their small table group and the larger room. Electronic voting was used to assist in building the large group identity, and allowed participants the opportunity to compare their opinions with others in the room. The outline below shows the balance that was struck between data collection through surveys, information provision from an expert, and time for group discussion to reflect on the information received and compare their reactions with those of others at the table and in the workshop (Ashworth et al, 2009a).

Table 1 Outline of large group workshop process

Time	Activity	Focus
8:45 – 9:00	Workshop registration	Individual
9:00 – 10:15	Welcome Round table introductions *Pre Questionnaire* Digivote Round 1 State of play	Large Group Small Group Individual Large Group Small Group
	MORNING TEA	
10:25 – 12:40	Expert presentation–Climate Change Expert presentation – Energy Tech. Expert presentation – CCS Reactions & points of clarification *Process Questionnaire*	Large Group Large Group Large Group Large & Small Individual
	LUNCH	
13:10 – 14:20	Group Discussions/Deliberation	Small Group
	AFTERNOON TEA	
15:00 – 16:30	Q & A with Expert Voicing concerns & Key messages *Post process questionnaire* Digivote Close	Large Group Large Group Individual Large Group

2.3 Data collection and analysis

In addition to completing a *pre* and *post* questionnaire at the beginning and end of the day, participants were also asked to complete a *process* questionnaire before lunch. In addition, all table discussions were recorded and transcribed, with facilitators documenting the key points that arose from discussions on their tables. During the afternoon break, facilitators convened to compare the main findings arising from their table discussions, and these were summarised into key messages that were then fed back to participants for purposes of clarification and representation.

Individual country results have previously been reported separately (Brunsting et al., 2011; Einsedel et al., 2011, Howell et al., 2012; Jeanneret et al., 2011). The current report presents a comparative analysis, with analyses run across the four countries combined. Qualitative comments were also compared across countries, including the key messages from each of the workshops, with major similarities and differences highlighted in the following sections.

3 Participant characteristics

3.1 Demographics

In total, 374 participants attended the workshops across the four countries. The workshop in the Netherlands had the highest number of participants (n=111), followed by Scotland (n=99), Canada (n=80) and Australia (n=84[5]). The gender distribution of participants in the Netherlands, Canada and Scotland was relatively even, with males slightly over represented compared to the population statistics of the relevant region. However, due to a number of no shows, in the Sydney workshop in Australia, the gender distribution was ultimately skewed towards males, with a greater representation overall of men (55%) than women (45%) in the cross-national dataset.

Table 2 Gender of workshop participants

GENDER	AUSTRALIA		NETHERLANDS		CANADA		SCOTLAND		ALL	
	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT
Male	53	63%	57	51%	43	54%	52	53%	205	55%
Female	31	37%	54	49%	37	46%	47	47%	169	45%
Total	84	100%	111	100%	80	100%	99	100%	374	100%

All age groups were represented by the workshop participants and, with the exception of Australia, the country samples roughly reflected the age distributions of their local populations. In Australia, younger people were under represented while those above 55 years of age, in particular, were over represented. This is likely due to the different recruitment methods used in Australia compared to the other countries, where a larger budget was provided for recruitment purposes.

Table 3 Age of workshop participants

AGE	AUSTRALIA		NETHERLANDS		CANADA		SCOTLAND		ALL	
	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT	FREQ.	PERCENT
18 – 25	4	5%	14	13%	9	11%	11	11%	38	10.16%
26 – 35	2	2%	20	18%	11	14%	23	23%	56	14.97%
36 – 45	16	19%	30	27%	16	20%	25	25%	87	23.26%
46 – 55	18	21%	25	23%	20	25%	14	14%	77	20.59%
56 – 65	21	25%	21	19%	17	21%	16	16%	75	20.05%
> 65	23	27%	1	1%	7	9%	10	10%	41	10.96%
Total	84	100%	111	100%	80	100%	99	100%	374	100.00%

Participants had a wide range of educational backgrounds but were generally highly educated. In Australia, two thirds (67%) of participants indicated they had completed tertiary education (diploma, bachelor's degree or post-graduate degree). Education levels were similarly high in the Canada workshop, with two-

[5] Australia is a combination of two workshops, Sydney and Collie

thirds of participants also having tertiary level qualifications (68%). The participants in Scotland and the Netherlands were also well-educated, with over half (55%) and almost one-third (31%) completing tertiary education, respectively.

The majority of participants were either employed full-time, part-time, or self-employed. In Australia (58%) and Scotland (60%) those in paid employment accounted for just over half the participants. The percentage of employed participants was somewhat higher in the Netherlands (73%) and Canada (66%). Due to the greater age of Australian participants there was a higher proportion of retirees/pension recipients in attendance compared to the other workshops. In Australia this category accounted for over a quarter of participants (29%, N=24), whereas retirees/pension recipients accounted for between 7% and 16% in the other workshops.

Workshop participants were employed across a range of occupations. Approximately one quarter of participants described themselves as professionals in the Australian (25%), Canadian (28%) and Scottish (24%) workshops. The Netherlands workshop used a different system of occupational categorisation, with the largest share of participants (22%) not fitting into the occupations described and selecting instead the "other" category.

3.2 Prior beliefs

3.2.1 PRO-ENVIRONMENTAL BELIEFS

The New Ecological Paradigm (NEP) scale was used to measure participants' environmental beliefs (Dunlap, Van Liere, Mertig & Jones, 2000). Participants were asked to rate fifteen statements about environmental beliefs on a scale of one *(strongly disagree)* to seven *(strongly agree)*, with respect to their opinion of the relationship between humans and the environment. An example statement is "Humans have the right to modify the natural environment to suit their needs". In Canada, participants were only asked six of the fifteen questions. Therefore, to directly compare across countries, only responses to this subset of six questions were averaged to form a single summary measure that ranged from 1=anti-environmental beliefs through to 7=pro-environmental beliefs. The average across all groups was 4.92 (SD=0.85) reflecting a moderate level of pro-environmental beliefs. The group average in the Netherlands was 4.70 (SD 0.66). For Scotland the group average was 4.89 (SD=0.82) and in Australia 4.97 (SD=0.86). Canada scored the highest average for pro-environmental beliefs at 5.20 (SD=1.03).

4 Awareness and knowledge

Participants were asked to answer *yes* or *no* to a range of topic areas to indicate their awareness of (a) climate change and related issues, and (b) energy sources and technologies. Participants were also asked questions about their self-rated knowledge in relation to climate change and energy technologies, as measured on the pre- and post-questionnaires. Participants' *objective* knowledge of climate change and energy was measured in the pre-workshop survey only.

4.1 Awareness of climate change and related issues

The majority of participants indicated they were generally aware of climate change and the other related issues that were listed, with an overall mean of 5.29 (SD=1.51) from a possible seven topics/issues/domains. Awareness of climate change and related issues was greatest in Australia, with a mean of 5.78 (SD=1.43), whereas participants in Scotland appeared least aware of the listed topics (M=4.76, SD=1.5). Overall, participants were least aware of the relationship between the price of electricity and greenhouse gas emissions, with only 40% claiming awareness of this topic. Across the workshops, however, participant awareness of this relationship ranged from 60% in Australia, to as low as 19% in Scotland. Australia has recently seen the introduction of a price on carbon and have experienced rising electricity costs due to a number of factors which seems to have had a influenced their awareness of the topic. The topic with the second lowest level of awareness was industry initiatives to reduce GHG emissions, with only 60% of participants indicating they were aware of this topic (Table 4).

Table 4 Awareness of climate change and related issues

	AUSTRALIA	NETHERLANDS	CANADA	SCOTLAND	ALL
Climate change	98%	100%	98%	98%	98%
Greenhouse gas emissions	96%	75%	93%	92%	88%
Government initiatives to reduce GHG emissions	83%	75%	63%	69%	72%
Industry initiatives to reduce GHG emissions	67%	66%	59%	50%	60%
Electricity conservation in the home	95%	100%	98%	90%	96%
Electricity conservation in the workplace	80%	89%	66%	62%	75%
The relationship between the price of electricity and GHG emissions	60%	39%	46%	19%	40%

4.2 Awareness of energy sources and technologies

Awareness of the range of energy sources and related technologies was generally high amongst participants. On average, participants claimed to be aware of 9 out of the 11 energy sources that were listed (coal seam gas was excluded from this analysis as it was not included in the Canadian survey). Awareness levels were highest in Australia (M=10.05, SD=1.55) and lowest in Scotland (M=8.95, SD=1.83).

Table 5 Mean number of energy sources and related technologies that participants were aware of

COUNTRY	MEAN PRE-TEST SCORE (S.D.)
Australia	10.05 (1.55)
Netherlands	9.81 (1.75)
Canada	9.29 (1.90)
Scotland	8.95 (1.83)
ALL	9.52 (1.81)

Not surprisingly, participants were aware of the more established and traditional sources of energy (Table 6). In terms of the energy sources and technologies, participants were most aware of wind (99%), solar (98%), natural gas (97%) and oil (97%) and they were the least aware of geothermal energy (62%), coal seam gas (64%) and CCS (65%). As shown in Table 6 below, participants were most aware of CCS in the Netherlands (84%), Australia (77%) and then Canada (61%). Scotland showed least awareness of CCS with only 36% indicating they were aware. It is likely the higher awareness in the Netherlands was because of the controversy associated with the failed Barendrecht project and the resulting ruling by the Dutch government that no CCS projects would take place on shore in the Netherlands. The Australian sample was also made up of representatives from the Southwest Hub[6] flagship project local community, which was more likely to be aware of the project and hence CCS.

Table 6 Percentage of participants aware of energy sources and technologies

	AUSTRALIA	NETHERLANDS	CANADA	SCOTLAND	ALL
Wind	99%	100%	99%	98%	99%
Solar	99%	100%	96%	97%	98%
Natural gas	98%	99%	98%	92%	97%
Oil	94%	98%	98%	96%	97%
Coal-fired	98%	93%	91%	97%	95%
Hydro	98%	90%	95%	92%	93%
Nuclear	96%	93%	90%	93%	93%
Biofuels	87%	92%	74%	70%	81%
Wave/tidal	86%	64%	63%	86%	74%
CCS	77%	84%	61%	36%	65%
Coal seam gas	76%	75%		43%	64%
Geothermal	75%	68%	66%	40%	62%

[6] Southwest Hub has been established to examine the options for CCS in the South West of Western Australia (WA) and is overseen by the WA Department of Mines and Petroleum. The project is part of the Australian Government's CCS Flagships Program.

4.3 Self-rated knowledge of climate change and related issues

Workshop participants were asked to rate their knowledge of climate change and related issues on a scale ranging from 1 to 7, where 1=no knowledge and 7=high knowledge. The mean scores for self-rated knowledge, displayed in Table 7 below, show that participants from each country tended to rate their knowledge of climate change and related issues as moderate. Australian respondents rated their knowledge the highest of all countries in both the pre- (M=4.49, SD=1.04) and post-workshop (M=5.11, SD=0.86) surveys. Respondents in Scotland rated their level of knowledge the lowest of all countries in the pre-workshop survey (M=3.41, SD=1.16). Regarding changes over the course of the workshop, self-rated knowledge of climate change and related issues increased significantly in all cases, with the greatest increase evident in the Scottish workshop, which is not surprising given that these participants felt they were starting from a lower knowledge base.

Table 7 Change in self-rated knowledge of climate change and related issues

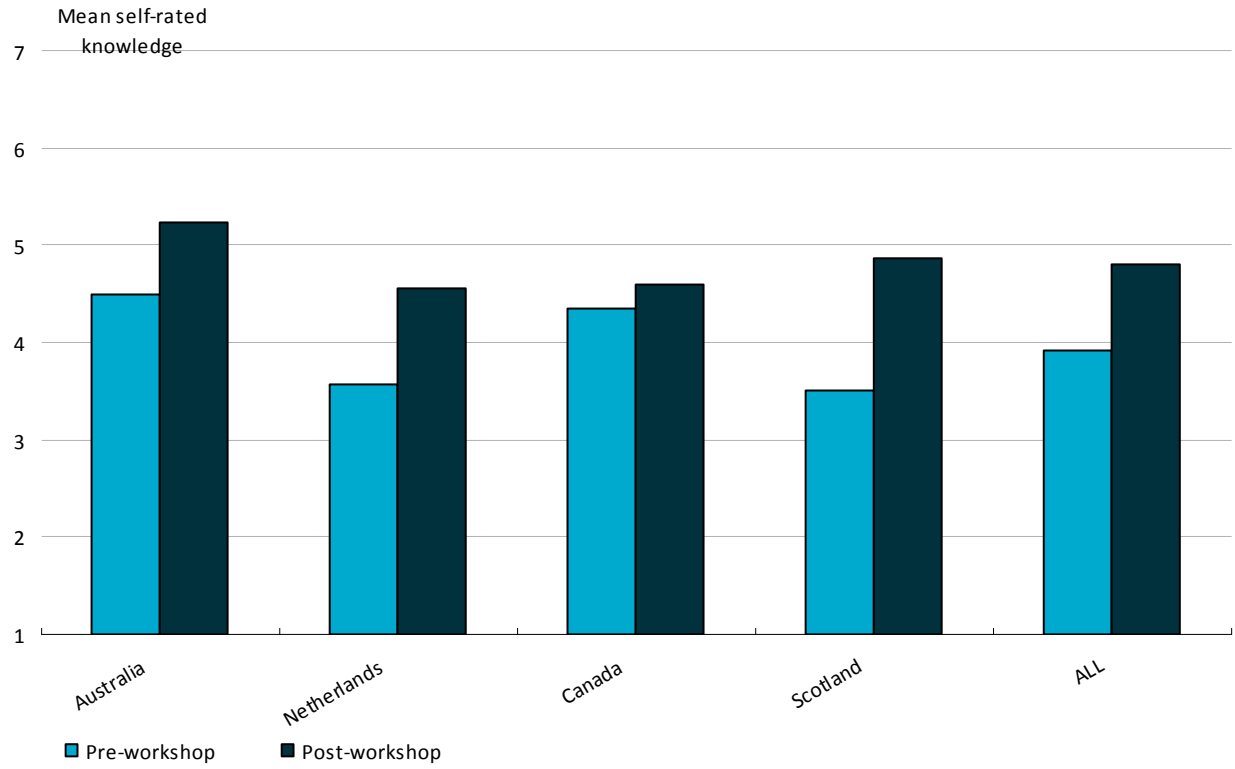
COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.49(.13)	5.11(.10)	.62(.09)***
Netherlands	3.63(.10)	4.62(.08)	.99(.09)***
Canada	4.08(.12)	4.62(.11)	.53(.10)***
Scotland	3.41(.11)	4.67(.10)	1.26(.11)***
ALL	3.86(.06)	4.74(.05)	.88(.05)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

4.4 Self-rated knowledge of energy sources and related technologies

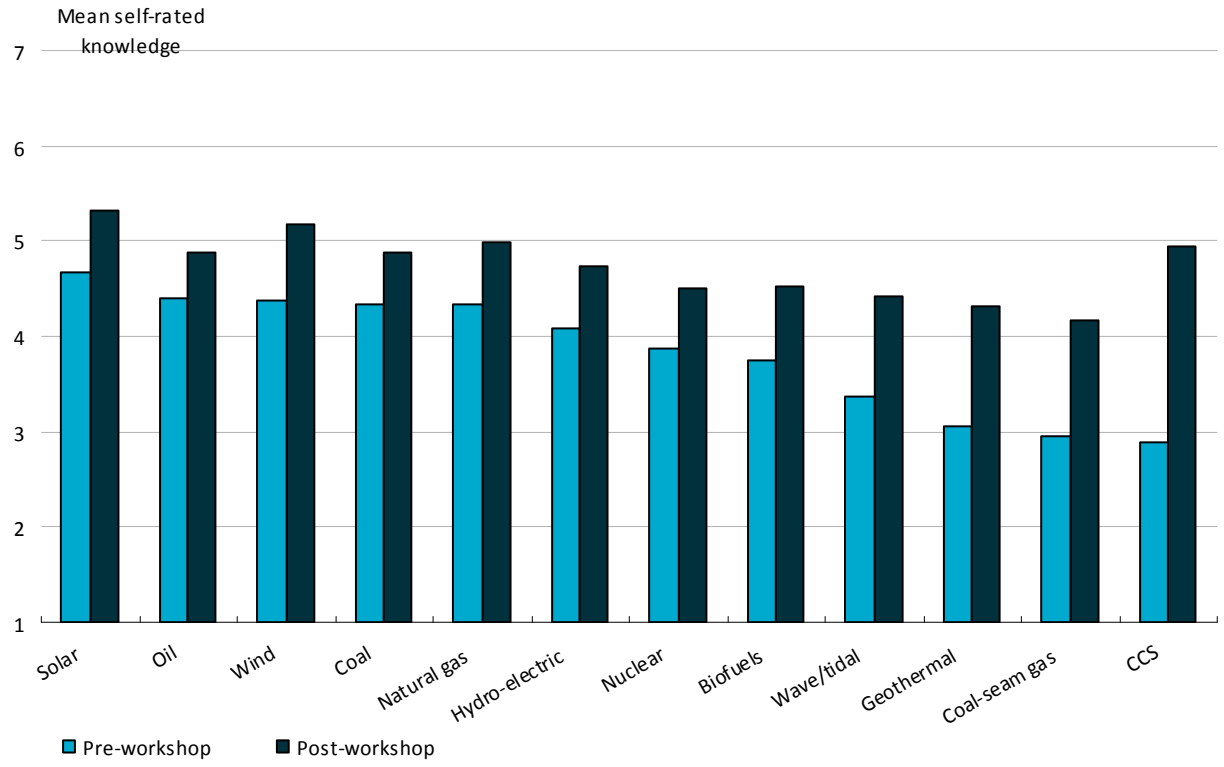
Participants also rated their knowledge of energy sources and related technologies at the beginning, midpoint and end of the workshop. Overall, participants judged their knowledge of energy sources and related technologies to be moderate. Respondents from Australia gave themselves the highest ratings of all participants at both the beginning and end of the workshop, while knowledge ratings were consistently the lowest in Scotland. Knowledge of energy sources and related technologies significantly increased during each of the workshops; however the degree of change varied across countries. As shown in Figure 1, the largest increase in self-rated knowledge occurred in Scotland (Mean difference = 1.34, p<.01), followed by the Netherlands (Mean difference = 1.00, p<.01), the two countries with the lowest knowledge scores at the outset. The shift in self-rated knowledge in the Canadian workshop was much lower when compared with other countries (Mean difference = 0.26, p<.01). Within the Canadian workshop, the expert paid less attention to the full range of energy options during the presentation, which likely explains some of the variation between Canada and the other countries.

Figure 1 Change in self-rated knowledge of energy sources and related technologies for each country



The results in Figure 2 indicate self-rated knowledge, pre-workshop, was highest for the older, more conventional energy sources such as coal, oil, solar and wind, while comparatively low for less developed energy sources and related technologies such as CCS, coal seam gas, geothermal and wave/tidal. The greatest changes in self-rated knowledge, with increases to moderate levels, are attributed to these lesser known technologies (Figure 2).

Figure 2 Mean self-rated knowledge of energy sources and related technologies for all workshops



Understandably, the greatest increase in the average self-rated knowledge score was in relation to CCS, with this technology being a particular focus of the workshops. The increases in knowledge for CCS for each country are shown in Table 8 below.

Table 8 Change in self-rated knowledge of carbon capture and storage

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E.)	MEAN DIFF. (S.E.)
Australia	3.64(.17)	5.04(.14)	1.40(.16)***
Netherlands	2.92(.13)	4.80(.11)	1.88(.13)***
Canada	2.92(.18)	4.89(.14)	1.97(.21)***
Scotland	2.13(.13)	5.09(.14)	2.96(.19)***
ALL	2.88(.08)	4.95(.07)	2.07(.09)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

The specific changes in the mean levels of self-rated knowledge for each of the technologies are listed in Appendix A. In regard to those country-specific changes for each of the energy technologies, we consistently saw significant improvements in self-rated knowledge in Australia, the Netherlands and Scotland. However, as reflected in the overall result (see Section 4.4 above), significant increases in self-rated knowledge for the different energy sources were less common during the Canadian workshop.

5 Attitudes

5.1 Attitudes toward climate change and related issues

Attitudes toward climate change and related issues were determined by the level of agreement with seven statements, rated on Likert scales ranging from 1 to 7 where 1="strongly disagree" and 7="strongly agree". Overall, participants from each of the workshops tended to agree with the statements presented, reflecting attitudes that generally conveyed concern about climate change and support for energy efficiency and sustainability. For example, participants agreed that climate change was an important issue for their country, and that more should be done to conserve energy and reduce greenhouse gas emissions. As shown in Table 9, agreement with these statements increased significantly during each of the workshops. Participants across the different countries also expressed similar sentiments during discussion time regarding the need for action from government and industry, for example:

> *"The government must take the lead in combating climate change."*
>
> The Netherlands, Brunsting et al., 2011, p. 27

> *"Where is the integrated approach, which has nothing to do with new energy technology, but what is it that we can do right now on an industry level, as federal level, as a society."*
>
> Australia, Jeanneret et al., (2012, in press) , p.24

> *"If you put the same amount of, like, impetus and government's money behind the renewable energy system as they do into their computer development system, I wonder if we'd be five times better in ten years with solar panels and stuff, or maybe they just don't have enough money."*
>
> Scotland, Howell et al., 2012, p. 22

> *"The government can rally industry to focus on improving practices."*
>
> Canada, Einsiedel et al. 2011, p. 36

Table 9 Change in attitude toward climate change and related issues

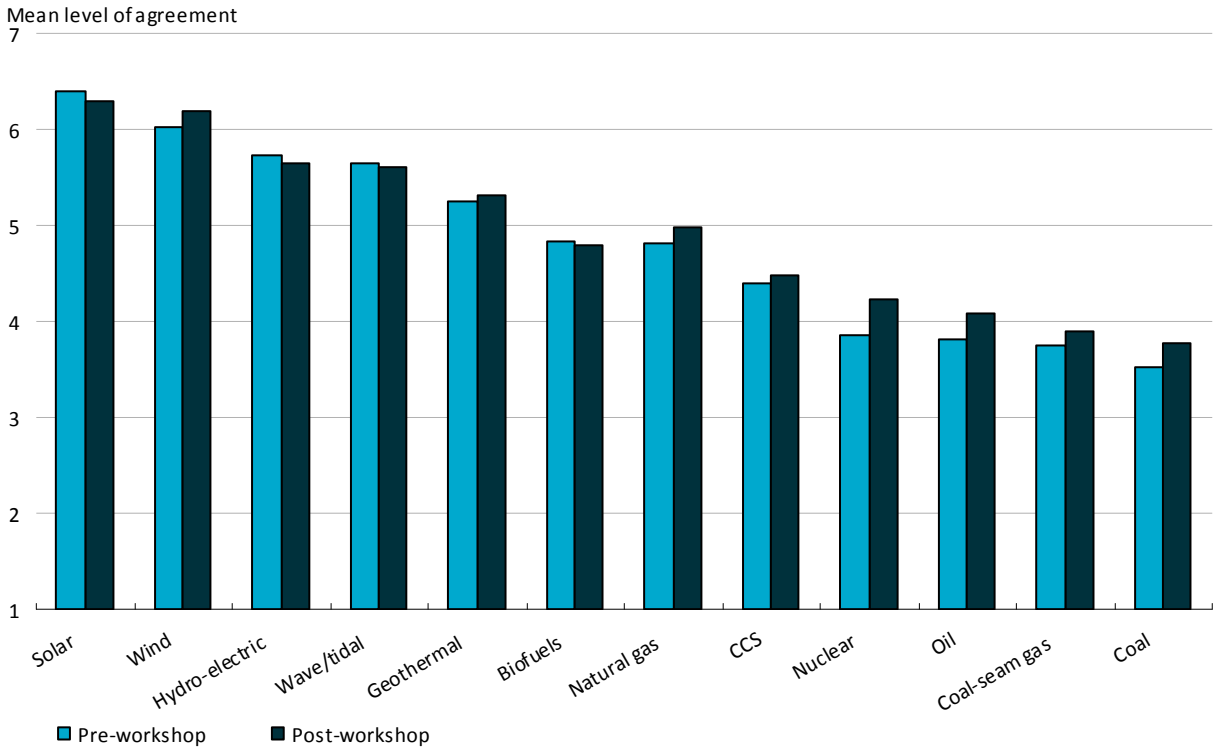
COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.60(.11)	5.97(.08)	.36(.10)***
Netherlands	5.19(.07)	5.34(.08)	.15(.05)***
Canada	5.29(.12)	5.78(.10)	.49(.09)***
Scotland	5.37(.09)	5.82(.08)	.45(.08)***
ALL	5.35(.05)	5.70(.04)	.35(.04)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

5.2 Attitudes toward energy sources and related technologies

Participant attitudes towards energy sources and related technologies were measured by their level of agreement with their use. Overall, attitudes toward the specific technologies were highly variable, as shown in Figure 3. Within this variability, it is clear that participants were generally more supportive of the use of renewable energy technologies than fossil fuels, and this remained true for all countries at all time points.

Figure 3 Mean level of agreement with the use of energy sources and related technologies for all workshops



These differences in attitude towards renewable energy and fossil fuels, and the *shifts* that occurred in regard to these technologies, are summarised in Figure 4 and Figure 5. The latter shifts in attitude are rather surprising. On the one hand, attitudes toward renewable energy technologies changed erratically across the different country workshops, decreasing significantly in both the Netherlands (mean difference = -0.2, $p<.01$) and Canada (mean difference = -0.31, $p<.01$), while becoming significantly more supportive in Scotland (mean difference = 0.45, $p<.01$), and remaining relatively unmoved in Australia. On the other hand, attitudes toward fossil fuels became uniformly more *positive* across the different country workshops (and significantly so everywhere but Australia), with support for the use of fossil fuels increasing significantly in the Netherlands (mean difference = 0.21, $p<.05$), Canada (mean difference = 0.23, $p<.05$), and Scotland (mean difference = 0.35, $p<.01$).

Figure 4 Change in attitude toward renewable energy sources

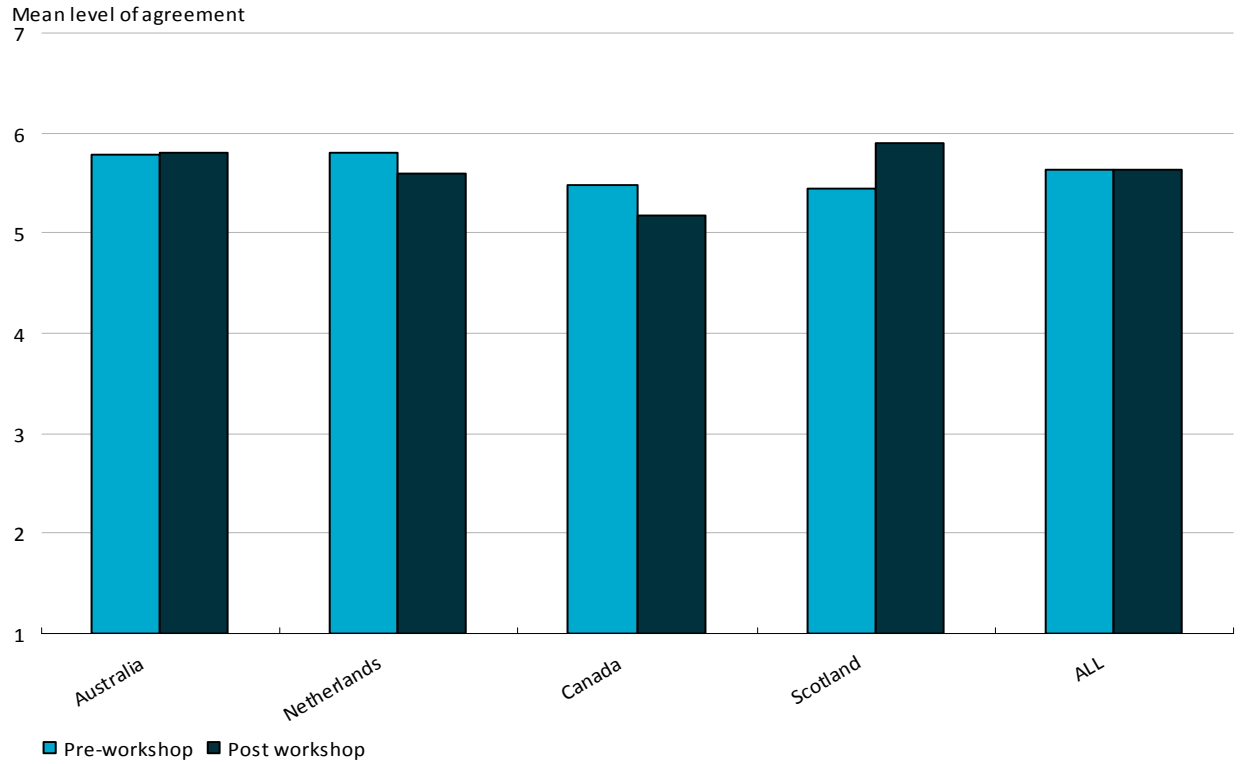
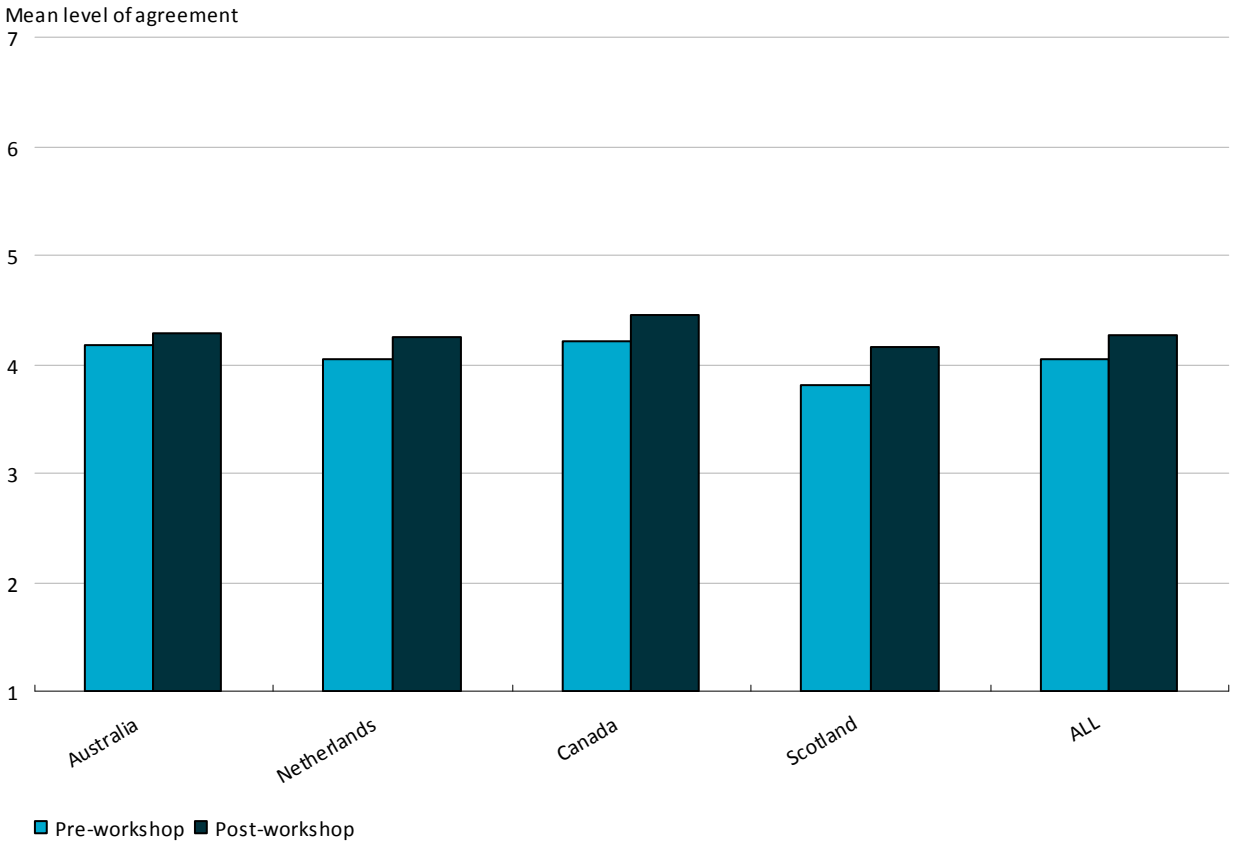


Figure 5 Change in attitude towards fossil fuel energy sources



As a result of these surprising attitudinal shifts, while (in all countries at all time points) participants remained more supportive of renewables than fossil fuels, the *relative* preference for the former over the

latter actually diminished somewhat for everyone except the Scots (who just became more supportive of everything), and significantly so for the Dutch and Canadians. While any account of these unexpected shifts must necessarily remain speculative at this stage, it is conceivable that successful explanation and promotion of CCS in the workshops might actually diminish environmental concerns around fossil fuels and, ultimately, *increase* support for their continued deployment. This is consistent with the support for CCS being offered by some environmental non-government organisations that see mitigation of carbon dioxide as critically important for short term action.

5.2.1 ATTITUDE TOWARD CARBON CAPTURE AND STORAGE

Overall, the attitudinal changes regarding the different energy sources and technologies were highly variable across the workshops, and often seemed specific to the country context. Participants in one workshop might become more supportive of a certain energy source, while others in another workshop temper their agreement with the same technology. The results in regard to CCS, in particular, provide a good example of the divergent shifts in attitude evident across the different workshops.

At the beginning of the workshops many participants were unsure of their opinion towards CCS, reflecting the low level of knowledge. During the workshop, the proportion of *unsure* participants considerably reduced, however the direction of this shift differed across countries. Participants in both Australia (mean difference = 0.66, p<.01) and Canada (mean difference = 0.88, p<.01) significantly increased their support for carbon capture and storage, evidencing moderate agreement with the use of CCS by the end of the workshop. However, the attitude change evident in the Netherlands (mean difference = -0.49, p<.01) and Scotland (mean difference = -0.38, p<.05) was to the contrary, with participants becoming significantly less supportive of CCS following the workshop (Table 10).

Table 10 Change in attitude toward carbon capture and storage

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.40(.17)	5.06(.17)	.66(.17)***
Netherlands	4.24(.14)	3.75(.15)	-.49(.10)***
Canada	4.52(.15)	5.40(.16)	.88(.20)***
Scotland	4.48(.13)	4.10(.17)	-.38(.19)**
ALL	4.40(.07)	4.48(.09)	.08(.09)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

As the focus of the workshop information was on CCS, a significant proportion of table discussions at each of the workshops centred on individual reactions to the technology. Some of the concerns that were raised included the potential environmental impacts, risks of the technology, and the cost of implementation. Other remarks appear more positive, suggesting that CCS constitutes a practical solution to reduce emissions while fossil fuels continue to be used. Some of the comments made by participants are included below.

> *"If CO_2 underground, there is a chance that they start drilling in the future at that same place which would release the CO_2 into the atmosphere. That would be a big problem!"*
>
> The Netherlands, Brunsting et al., 2011, p. 32

> *"A lot of good engineers work on CC, but they also make mistakes."*
>
> The Netherlands, Brunsting et al., 2011, p. 32

> *"We're not going to transfer to whether it's wind power or nuclear, we're not going to have that as a total source of energy. We're still going to have to use fossil fuels, so if you can take the carbon away from that, well, it's a short-term fix which is probably good."*

Scotland, Howell et al. 2012, p. 27

"CCS is a nice easy solution. You keep all your existing stuff and you suck the CO_2 out of the chimney."

Scotland, Howell et al. 2012, p. 27

"The experts this morning said this is a bridging technology and right now our demand for energy is so great we can't move away from fossil fuels in the short run. So what do you do? In the short run, you sequester the CO_2."

Canada, Einsiedel et al., 2011, p. 34

"It's really expensive. One billion dollars, but if it is going to work and it's the only solution that we have then maybe we should do it, but there's still other options we can look at before we spend all this money."

Canada, Einsiedel et al., 2011, p. 31

"There needs to be more on the environmental impact of it. For instance understand what the impact is on the water."

Australia, Jeanneret et al., (2012, in press) p. 29

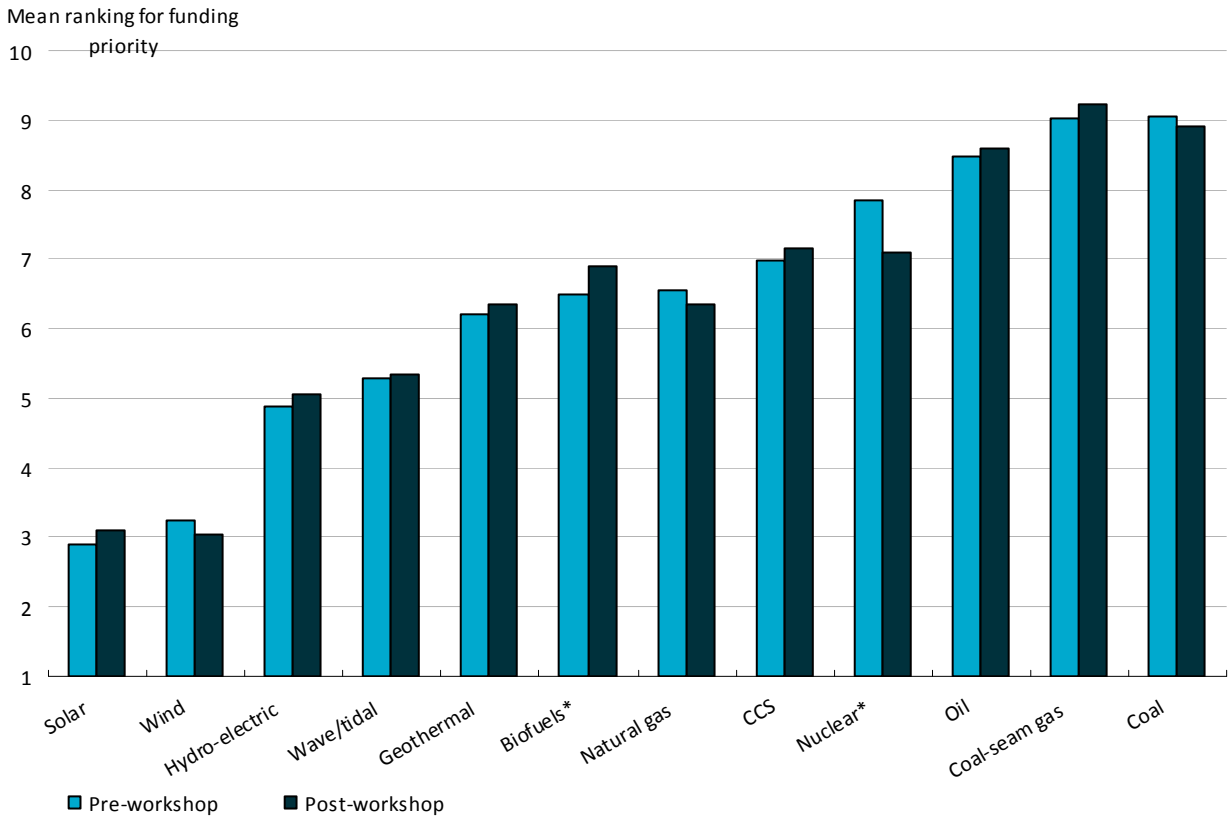
"I was interested to hear more details of how carbon capturing is supposed to work...I always thought it was promoted as a way to make the coal industry look cleaner or look like they are trying to do something...but if it works, then it's certainly worth putting money into." (Australia)

Australia, Jeanneret et al., (2012, in press), p. 30

5.3 Energy preferences

At the beginning and end of the workshop, participants were asked to rank each of the energy technologies in order, according to how they would prioritise the allocation of public funds to their development and implementation. Participants assigned the number 1 to their most preferred option and the number 12 to their least preferred option, therefore a lower number represents a higher priority. While the funding priority order was slightly different in each country, the overall pattern mirrored that which we discerned in attitudes toward the different energy technologies. Renewable energy options were clearly prioritised over fossil fuels, but lost a little of their relative 'edge' across the course of the workshop, as better understanding of CCS (presumably) made continued use of coal and natural gas seem feasible. The overall mean ranking for funding priority of each technology is shown in Figure 6 (averaging across participants in all workshops).

Figure 6 Change in mean ranking for funding priority of energy sources and related technologies



5.3.1 PREFERENCE FOR CCS

The mean funding priority rankings for CCS at the start of the workshops were relatively similar across countries, but diverged considerably thereafter. Australia was the only workshop not to experience a significant shift in CCS funding priority rankings, while again Canadian support for the allocation of public funds to the development and implementation of CCS significantly strengthened (mean difference = -1.38, p<.01) as Dutch (mean difference = 0.64, p<.10) and Scottish (mean difference = 1.52, p<.01) prioritization of CCS weakened.

Table 11 Change in priority ranking of CCS for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.99(.36)	6.37(.40)	-.62(.45)
Netherlands	7.82(.25)	8.46(.29)	.64(.34)*
Canada	6.18(.35)	4.81(.36)	-1.38(.39)***
Scotland	6.56(.29)	8.08(.31)	1.52(.41)***
ALL	6.97(.16)	7.14(.18)	.17(.21)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests)

6 Trust in information sources

Research has shown that trust in the source of information is an important consideration for credibility of the information. It was thus considered useful to examine the sources of information most trusted by our workshop participants. In the pre-workshop survey, participants were asked how much they trusted a wide range of information and news sources in turn. Levels of trust were rated on a scale of 1 to 7, where 1="distrust a lot" and 7="trust a lot". Table 12 shows the mean levels of trust evidenced in the different workshops for each information source. While these ratings appear remarkably consistent across countries, it is nevertheless evident that Dutch participants tended to have higher levels of trust across multiple information sources.

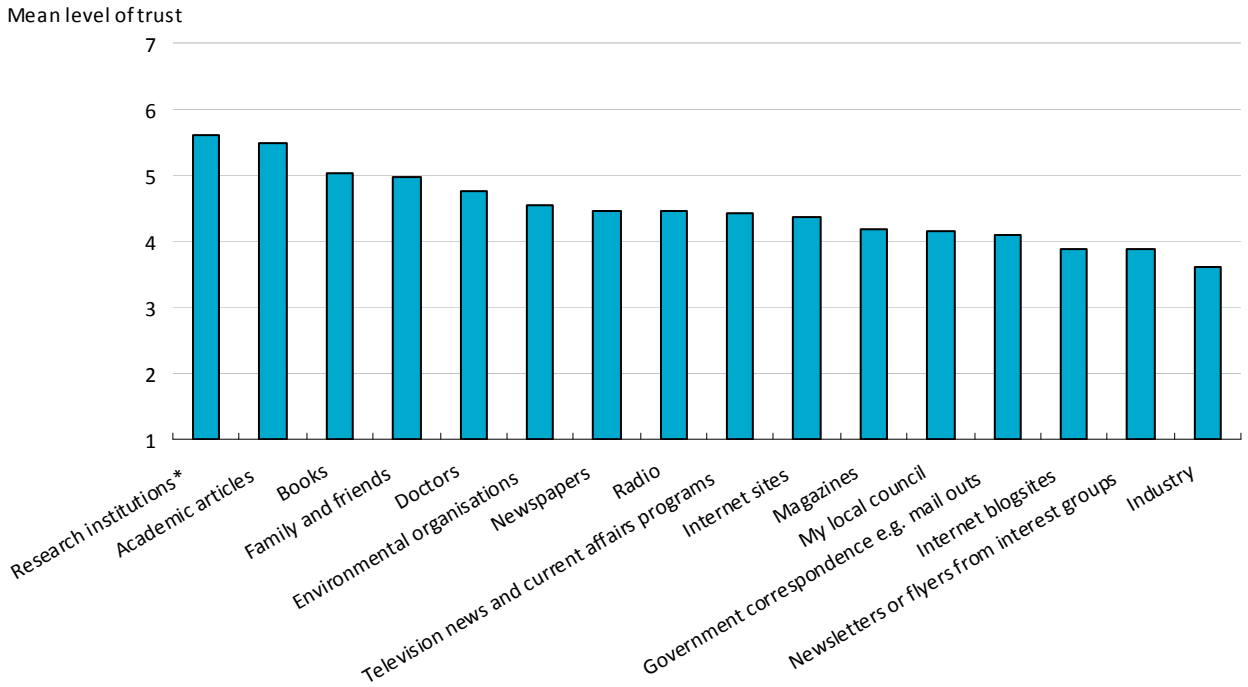
Table 12 Mean level of trust in information sources

COUNTRY	AUSTRALIA	NETHERLANDS*	CANADA^	SCOTLAND	ALL
Research institutions	5.77 (1.02)	5.61 (0.96)	-	5.47 (1.09)	5.61 (1.03)
Academic articles	5.65 (1.01)	5.50 (1.24)	-	5.32 (1.27)	5.48 (1.19)
Books	5.10 (0.99)	5.00 (1.21)	4.94 (1.30)	5.08 (1.11)	5.03 (1.16)
Family and friends	4.54 (1.27)	5.21 (1.41)	4.69 (1,40)	5.22 (1.29)	4.96 (1.37)
Doctors	4.74 (1.24)	-	4.49 (1.51)	5.02 (1.22)	4.77 (1.34)
Environmental organisations	4.51 (1.47)	4.65 (1.40)	4.24 (1.76)	4.67 (1.43)	4.54 (1.51)
Newspapers	3.90 (1.46)	4.75 ((1.22)	4.45 (1.32)	4.58 (1.34)	4.46 (1.36)
Radio	4.11 (1.48)	4.50 (1.25)	4.15 (1.30)	4.94 (1.21)	4.46 (1.34)
Television news and current affairs programs	3.68 (1.40)	4.84 (1.32)	4.13 (1.38)	4.86 (1.33)	4.43 (1.44)
Internet sites	4.15 (1.20)	4.79 (1.18)	4.05 (1.51)	4.30 (1.30)	4.36 (1.32)
Magazines	3.73 (1.45)	4.39 (1.18)	4.45 (1.32)	4.12 (1.35)	4.19 (1.34)
My local council	4.24 (1.33)	4.46 (1.35)	3.65 (1.45)	4.15 (1.45)	4.16 (1.42)
Government correspondence e.g. mail outs	3.78 (1.45)	4.67 (1.28)	3.58 (1.56)	4.12 (1.35)	4.10 (1.47)
Internet blogsites	3.24 (1.41)	4.79 (1.18)	3.45 (1.50)	3.69 (1.46)	3.87 (1.51)
Newsletters or flyers from interest groups	3.47 (1.41)	4.45 (1.26)	3.37 (1.30)	3.93 (1.49)	3.87 (1.43)
Industry	3.57 (1.37)	3.75 (1.51)	3.44 (1.53)	3.64 (1.59)	3.62 (1.50)

Note: Standard deviations are provided in brackets. *Netherlands combined Internet sites with Internet blogsites and did not include Doctors. ^Canada combined Newspapers and Magazines and did not include Academic articles or Research institutions.

Overall, the most trusted sources of information were research institutions (M=5.61, SD=1.03), academic articles (M=5.48, SD=1.19) and books (M=5.03, SD=1.16), followed by family and friends (M=4.96, SD=1.37). The information sources trusted the least by participants were industry (M=3.62, SD=1.50), internet blog sites (M=3.87, SD=1.51), and newsletters or flyers from interest groups (M=3.87, SD=1.43) (see Figure 7 for graphic illustration).

Figure 7 Mean levels of trust in information sources



Note: * The CSIRO (Australia), Onderzoeksinstituten (Netherlands) and Universities and research institutes (Scotland)

7 Key messages arising from discussions

A number of common themes emerged from the discussion and deliberation sessions conducted as part of the workshop process. They were of course centred on the major topics that were presented: climate change and energy sources. Climate change was a significant topic of discussion in the workshops. Participants generally acknowledged that climate change was an issue that should be addressed. A common sentiment evident in the conversations was the questioning of the role humans had played in causing climate change. Some participants were reported to be sceptical of anthropogenic climate change and cited natural cyclical changes as the main cause.

The need to rely on a wide range of energy sources was a common theme during discussion time in all workshops. The Dutch and Scottish participants expressed their preference for renewable energy sources and showed a similar interest in further understanding the costs and benefits of these technologies. Understandably, CCS was a focus of discussions in each of the workshops. As foreshadowed by the findings reported herein, there was acknowledgement across the workshops that CCS could feasibly form part of the solution in reducing greenhouse gas emissions while fossil fuels continue to be used. However, many participants shared concerns about CCS, including the cost of implementation, uncertainties about the technology, potential leakage of CO_2, and other safety concerns.

Another common theme in the workshop discussions was the notion that more action was required to address climate change and reduce greenhouse gas emissions. Although there was some debate about varying levels of responsibility, this sentiment was generally directed not only towards government and industry, but also to individuals and consumers. With regard to government actions, a range of options was discussed across the workshops. For example, Canadian and Australian participants described a need for greater incentives from the government in order for industry and the community to adopt better practices. This is best illustrated in a quote from the Canadian workshop:

> *"And for society we need to quit fretting about doing good for the environment, and actually DO something. We need to quit whining when we have to pay taxes too, because that is how we can afford to take on these initiatives. Someone has to inevitably pay for all of this, which means the taxpayer."*
>
> Canada, Einsiedel et al., 2011, p. 37

Dutch, Australian and Scottish participants typically called for further investment in renewable energy. At the level of individual responsibility, the choices of consumers and their energy usage were frequent topics of discussion. Despite some sentiment that the impact on greenhouse gas emissions would be minimal, participants acknowledged that individuals had a role to play. In addition, Canadian and Australian participants highlighted the importance of information dissemination in encouraging change within the community. In Canada participants were keen to see more education on the environment, to ensure that Canadians better understood what they could do to help.

This focus on the role of information also raised the issue of trust, a common topic of discussion. The importance of trust was particularly prominent as a discussion theme in the Australian, Canadian and Scottish workshops, but less so in the Netherlands. Scottish participants appeared to be particularly sceptical of the workshop process, with some perceiving self-interest driving the funding of the project and reliance upon energy experts with particular leanings. This led to some doubts about the process and its purpose, particularly with the focus on CCS.

8 Evaluation of the workshop process

Participants were also asked a series of questions about the workshop process in order to understand their immediate reactions to being engaged in this way. It is well documented that trust tends to bring about greater tolerance of uncertainty and openness to new information, particularly for topics about which citizens have little knowledge (Siegrist & Cvetkovich, 2000). Trust was therefore a fundamental consideration in the process, and participants were accordingly asked at both the middle and end of the experience: “To what extent do you trust the information provided in the workshop?” The response scale ran from 1="not at all" through to 7="very much". Table 13 shows that although participants indicated a reasonably high level of trust in the information provided after the expert presentation mid-way through, the mean level of trust declined slightly over the day everywhere but Australia, with the Dutch, followed by the Scots ultimately manifesting the least trust in the workshop information.

Table 13 Change in mean level of trust in the workshop information

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.42(.13)	5.64(.11)	.22(.07)***
Netherlands	5.25(.10)	5.18(.09)	-.07(.08)
Canada	5.84(.11)	5.71(.11)	-.13(.09)
Scotland	5.58(.10)	5.41(.09)	-.18(.09)**
ALL	5.51(.06)	5.46(.05)	-.05(.04)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

Participants were also asked to select from a proffered list of six ("convince", "engage", "influence", "consult", "inform", and "access my opinions") any words they felt reflected the main purpose of the workshop. Table 14 shows the percentages from each country that selected any of these options. Consistently across countries, participants generally suggested that the main purposes of the workshop were to *inform* (71.7%), *access opinions* (59.2%) *and/*or to *engage* (53%), which nicely reflect the overarching goals. However, almost one-fifth of participants in Scotland, Canada and the Netherlands (compared to just 11% in Australia) thought the purpose of the workshop was to *convince.*

Table 14 Perceived purpose of the workshop in percentage

COUNTRY	AUSTRALIA	NETHERLANDS	CANADA	SCOTLAND	ALL
Inform	76.2%	51.3%	84.1%	78.4%	71.7%
Access my opinions	54.70	47.7%	65.9%	69.1%	59.2%
Engage	53.60	33.3%	61%	65%	53%
Consult	23.80	25.2%	30.5%	48.5%	32.6%
Influence	25%	16.20	31.7%	29.9%	25.3%
Convince	10.70	18%	20.7%	18.6%	17.4%

Note: Cell entries are percentage of participants selecting that response. Note that participants could select more than one option; therefore the sum for each country is not equal 100%.

Another component of the process that was felt to be important was participants' level of identification with the group, both with their own table members and the workshop group as a whole. According to social identity theory (SIT), group identification is an individual's knowledge that they belong to a certain social group, together with the emotional and value significance they place on their group membership (Abrams, 1999; Gallois & Giles, 1998; Tajfel & Tuner, 1986). Group identification may be vital to creating and sustaining dialogue within groups, with self concept and inter-group relations being heavily interdependent (Hogg & Abrams, 1999). SIT explains how individual behaviour is influenced by the group, both between groups and within the group. When people identify strongly with a particular group their individual differences are minimized and the in-group norms become more salient (Hogg & Terry, 2001; Terry, Hogg, & Duck, 1999). These circumstances are thought to make it easier for participants to discuss their ideas freely as well as challenge one another about their ideas. For these reasons it was deemed important in the workshop process to develop and assess group level identification. Within the process, time was allowed to develop a sense of identity with both the smaller table group and the larger workshop group (refer to Table 1)

Table 15 shows the mean level of participant identification with their table group at the lunch break, and then again at the end of the day. Participants were asked to select from among a series of increasingly overlapping circles, which one most accurately reflected their identification with their group (with responses scored from 1="no overlap" through to 7="strong overlap"). Most participants seemed to develop some level of identification with their table group over the course of the workshop, with significant increases in group identity evident across the board.

Table 15 Change in level of identification with table group

COUNTRY	MEAN MID-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.82(.19)	5.19(.18)	.37(.15)**
Netherlands	4.09(.14)	4.39(.14)	.29(.13)**
Canada	3.70(.18)	4.26(.18)	.56(.14)***
Scotland	4.83(.14)	5.27(.15)	.45(.12)***
ALL	4.36(.08)	4.76(.08)	.41(.07)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

As was expected, participants generally evidenced less identification with the workshop group as a whole, however that identity still grew over the course of the day everywhere except Canada (see Table 16). It is thought that a key mechanism for increasing identification with the larger group was the use of an electronic voting system, which allowed everyone in the room to 'see' what others were thinking. It is notable that Canada was unable to source this vital equipment, and over the course of the workshop Canadians' identification with the workshop group actually declined, suggesting that the electronic voting mechanism may well have been consequential in building the *larger* group identity. Note that Canadians at the same time showed the greatest increase in identification with their *own* table members.

Table 16 Change in level of identification with workshop group

COUNTRY	MEAN MID-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	3.86(.18)	4.30(.18)	.44(.15)***
Netherlands	3.72(.14)	3.80(.15)	.08(.13)
Canada	3.37(.16)	3.24(.19)	-.14(.16)
Scotland	3.88(.16)	4.36(.16)	.48(.13)***
ALL	3.72(.08)	3.93(.09)	.21(.07)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

9 Discussion

The comparative results from the four countries reinforce previous observations that strong support for renewable energy technologies exists around the globe. This seems particularly salient, in the absence of information about the current global energy mix that is predominantly fossil fuel based. Although over the course of the workshop participants support for fossil fuels increased slightly, when prioritising their preferences for energy technologies participants' indicated stronger preferences for renewable energy sources over fossil fuel based sources. This included CCS being less favoured over renewable energy, despite it being shown as a mechanism to decarbonise energy production from fossil fuels.

This support for renewable energy needs to be a major consideration for any government aiming to invest large sums of public money in CCS. It was deemed particularly important by many participants that investments into renewable energy technologies should not suffer because of investment in CCS. That is, there was little tolerance in trading off between CCS with renewable, there was an expectation that they should continue in parallel. Many participants' expressed concerns that any investment in CCS would be detrimental to the ongoing development of renewable energy best reflected in the quote below.

> *"Solar, wind and geothermal are preferred technologies to use. CCS makes it possible to reach targets on the short term. But CCS is probably an expensive solution that demands money that could be spent better to solar, wind and geothermal."*
>
> Brunsting et al., 2012, p. 45

As has been highlighted in previous research – acknowledgment of the portfolio of options is helpful in allaying concerns that CCS may take precedence in investment over renewable energy forms.

Additionally, participants' tended to focus their perceptions of CCS on the perceived risks and uncertainties associated with the technology. Almost all countries raised questions around its safety, the likelihood for unplanned leaks of CO_2, and questions about its ability to allow CO_2 to remain stored for long periods of time. The examples of frequently asked questions always arise whenever individuals are first presented with information about CCS and this is unlikely to change until there are large scale projects commercially deployed for some period of time. Therefore, independent information needs to be made readily available to stakeholders about the state of play of the common concerns that constantly arise. This could be achieved by developing a series of fact sheets that are peer reviewed by a diverse set of stakeholders that may have opposing views around the potential of CCS. Workshopping the latest *facts* through such a process can help to improve the credibility of the information being presented.

> *"CCS is not a good solution for the long term. Because safety issues are not clear (in case of a disaster) and there is doubt whether the CO_2 will stay underground on the longer term. It's an interim solution. Why should you do CCS when you have better options?"*
>
> Brunsting et al., 2012, p. 45

> *"They're presuming the effects in 1000 years time … how do they know that? It's all hearsay you know"*
>
> Howell et al., 2012, p. 37

As in earlier work identified by Bradbury and colleagues (2009) it appears that context does matter to individuals, in this case, the energy context of a particular country. In both Canada and Australia, support for CCS improved over the course of the workshop. Both countries are resource rich economies with a strong mining presence and a reliance on fossil fuels for economic prosperity. Such information was presented to participants and at the same time, most seemed to be aware of the energy mix and reliance on exports of fossil fuels for their country. Several participants suggesting that CCS would be essential for long term credibility of exporting coal as illustrated in the quote below.

"We should export as much coal as we can for as long as we can but without clean coal we've got not chance. If we can't figure out how to do clean coal we won't have a coal industry"

Australia, Jeanneret et al., (2012, in press), p. 32

Similarly, the history of unsuccessful attempts at CCS projects, such as Barendrecht, in the Netherlands and Longannet in Scotland, appears to have negatively influenced the overall sentiment of participants in these countries toward CCS when asking them to prioritise between low carbon energy options.

Another reason for the low level of support for CCS in the Scottish group may also relate to the lack of confidence in the expert and their answers to some of the questions. Best reflected in the quotes below:

"They're telling you what they're proposing to do, they're not telling you what they've got in place in case there's a leakage."

A: *"We tried asking the question … what would be the problem if this did leak, would it affect people's health? But [the expert] never really gave us an answer."*

B: *"The answer was that it won't leak."*

A: *"They don't know."*

"She couldn't answer the second question. If she is an expert in her field she should be able to answer it properly."

Howell et al., 2012, p. 37

Given that some participants felt that the expert was not answering questions directly it seems to have led participants to become slightly less trusting of the information that was presented (see Table 13). Additionally, Scotland had the greatest identification with both the table group and large group; therefore any questioning of the integrity of the expert information by some participants is likely to have had a greater cascading effect on overall attitudes towards the technology.

However, not all participants were against the technology, with some being quite positive, suggesting it should not be too hard to make it happen over the longer term.

"I suppose a lot of it is, do you trust geologists? Geologists are good enough to find these oil fields and suchlike in the first place, they've got the technology to do that, they've got the technology to advise the companies on how to get it out, I reckon I could trust them to put this stuff in again. These deposits have been down there for countless, millions of years. I can't see any reason why we can't put this stuff back to where it came from."

Howell et al., 2012, p. 37

Some participants were also wary and sceptical about funding a workshop that focused so much on CCS, perhaps at the expense of renewable energy. This was evident in the comments both from the Netherlands and the Scottish workshop where some questioned the process being biased towards CCS which seemed to have a counter effect on participant attitudes towards CCS. However, at the same time there was some recognition that such vested interest could equally exist for wind power and other energy sources and not just CCS. The example quotes from Scotland below again highlight the importance of ensuring balanced information about the portfolio of options is presented.

"We are quite sceptical about the whole thing (this workshop), they are spending a lot of money on us being here and maybe they should have put that into actual renewable energy research."

"This [day] has been incredibly biased towards CCS. If they are trying to find out our general views on climate change and control of emissions, it needs to be a more well balanced ..... who is actually creating this bias? … I've got a problem with the government using information from a company that has a vested interest in it …."

"People seem quite suspicious about anything that comes from government about renewable energy and the environment ….. Some of the stuff that has come out of this [workshop] has been

really positive, about wind power and how they want Scotland to be a forerunner of this in the world."

Howell et al., 2012, p. 42

However, this issue did not arise in the Collie Hub workshop, where from the outset, the purpose of the workshop was stated to inform the local community about a prospective CCS project that may soon be operating in their town. In this instance participants were appreciative of the fact that the organisation and its expert scientists had taken the time to explain to them more about what they knew about the technology. This seems to point to the importance of transparency in any engagement processes that will take place when aiming to inform local communities about potential CCS projects.

Despite the range of countries being represented, the large group process had an overall positive effect on participants' self-rated knowledge of various energy technologies. Previous research by Hobman and Ashworth (in press), has demonstrated that self rated knowledge had an important influence on participant perceptions of various technologies. That is, the more they feel they know about a technology, the more confident they often are in their assessment of each technology.

One of the major aims of the large group process was to provide background information on climate change and energy technologies, and to enable peer to peer discussion around what they have heard as part of the process. The results indicate that the workshop was successful at informing participants about the range of energy technologies as well as providing them with a safe environment to openly discuss their viewpoints about the range of low carbon energy options. However, such a process will never produce the deep deliberations that can arise from conducting a longer citizen panel or similar process that takes place over a series of weekends. The length of time that participants are involved in such a process may also impact on their overall impressions of the technologies being presented.

Finally, there is also a question around the role of the presenters. Although in the research we attempted to control for as many differences as possible by ensuring similar materials were presented in each workshop, the presenters were obviously perceived differently. How presenters were perceived depended on who they were and how they were viewed by the participants in each workshop. As such, individual differences between the experts and how they were perceived seems to have influenced participants' overall reactions to the experts and then indirectly their perception on the technologies. The only possible way to control for this more closely is to use the same expert, by either flying them to all workshop locations or perhaps trial using a video conference facility that would allow the expert to appear at all workshops in the same manner. However, language issues and different cultural issues may become problematic. Similarly, experts from a trusted organisation in Australia are less likely to carry the same credibility if presenting in the Netherlands, Scotland or Canada, although if they held international standing this may alleviate such considerations.

10 Conclusions

The findings from the large group process indicated that this is an appropriate process for sharing information around complex issues such as energy and climate. This was particularly evidenced by the increase in group identification over the course of the workshop. The results seem to indicate that little was lost by engaging up to 100 people in the room rather than just the normal ten that would be likely to participate in a focus group. As such, the large group process has potential to be used to engage larger numbers of people within a local community to discuss CCS, as it still allows participants to feel that they have been heard. This is perhaps in contrast to the more traditional town hall style meeting where only the loudest voices tend to be acknowledged and can have the greatest influence on the outcome. The town hall meeting style has been problematic where individuals with strong opinions have protested loudly around energy technologies moving forward – use of the large group process allows the whole room's opinion to be openly shared through use of electronic voting and table facilitators.

The workshops also represented an effective means for participants to raise their issues of concern that will need to be considered by governments wishing to further develop CCS as a way of decarbonising their existing energy mix. The most obvious being the lack of ability for lay public to comprehend any tradeoffs between investing large sums of money in CCS to extend fossil fuel use over investment in renewable energy. To maintain credibility both options will need to be pursued in parallel as the public is not likely to accept CCS at the expense of investigating renewable energy options. Acknowledgment by governments of the portfolio of options will be helpful in allaying concerns that CCS may take precedence in investment over renewable energy forms. This is also an important consideration in the messaging of the Institute as well. Although, the Institute is an advocacy body for CCS, to ensure its credibility, it needs to acknowledge the importance of the portfolio of energy options of which CCS is an important component.

Similarly, the same frequently asked questions continue to arise at every process that engages individuals about CCS. A series of information sheets that answer these questions will be extremely useful for local projects. The information needs to be peer reviewed by a diverse set of stakeholders that may have opposing views around the potential of CCS. Workshopping the latest *facts* through such a process can help to improve the credibility of the information being presented as demonstrated in the earlier research. These would also be helpful when experts may not have all the answers at their finger tips. Being able to refer individuals to peer reviewed information sheets that are written in laymen's language would help to overcome any doubt or scepticism by experts not directly answering any questions raised.

Finally, Section 6 outlines that across developed countries at least, there seems to be consistency in the sources of information that individuals place trust in. Figure 7 shows the average hierarchy of trust in information sources and communications experts should consider how best to utilise the various channels to share information about CCS and its relationship to the portfolio of options. Of course there is always the trade off of when to start the engagement process. The risk communication literature suggests that new technologies with associated uncertainties are more likely to be successfully deployed when an early engagement process with a broad spectrum of stakeholders is employed. This becomes even more critical when the deployment of the technology is dependent on the investment of large sums of public monies.

Appendix A Statistical tables

A.1 Results for awareness

A.1.1 AWARENESS OF CLIMATE CHANGE AND RELATED ISSUES

Apx Table A.1 Mean number of climate change and related issues that participants were aware of

COUNTRY	MEAN PRE-TEST SCORE (S.D.)
Australia	5.78 (1.43)
Netherlands	5.43 (1.51)
Canada	5.21 (1.44)
Scotland	4.79 (1.50)
ALL	5.29 (1.51)

A.1.2 AWARENESS OF ENERGY SOURCES AND RELATED TECHNOLOGIES

Apx Table A.2 Mean number of energy sources and related technologies that participants were aware of

COUNTRY	MEAN PRE-TEST SCORE (S.D.)
Australia	10.05 (1.55)
Netherlands	9.81 (1.75)
Canada	9.29 (1.90)
Scotland	8.95 (1.83)
ALL	9.52 (1.81)

A.2 Results for self-rated knowledge of energy sources and related technologies

Apx Table A.3 Change in self-rated knowledge of energy sources and related technologies

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.50(.12)	5.23(.10)	.73(.09)***
Netherlands	3.56(.12)	4.56(.09)	1.00(.09)***
Canada	4.34(.13)	4.59(.12)	.26(.09)***
Scotland	3.51(.12)	4.86(.10)	1.34(.12)***
ALL	3.92(.06)	4.80(.05)	.87(.05)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.1 SELF-RATED KNOWLEDGE OF WIND ENERGY

Across each country participants were found to have similarly moderate ratings for knowledge of wind energy. Self-rated knowledge of wind energy was found to significantly improve in Australia, the Netherlands and Scotland following the workshop, however there was very little change in the ratings of the Canadian participants.

Apx Table A.4 Change in self-rated knowledge of wind energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF. (S.E.)
Australia	4.56(.14)	5.49(.11)	.94(.14)***
Netherlands	4.20(.12)	4.94(.10)	.74(.10)***
Canada	4.78(.15)	4.84(.16)	.07(.12)
Scotland	4.12(.13)	5.43(.11)	1.31(.15)***
ALL	4.38(.07)	5.17(.06)	.79(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.2 SELF-RATED KNOWLEDGE OF NUCLEAR ENERGY

Self-rated knowledge of nuclear energy was moderate across all workshops, with Australian participants' ratings somewhat higher than the other countries. Significant increases in self-rated knowledge of nuclear energy were experienced in all workshops. The greatest changes, as shown in Apx Table A.5, were in the Netherlands (difference between means 0.81, $p<0.01$) and Scotland (difference between means 0.89, $p<0.01$) workshops.

Apx Table A.5 Change in self-rated knowledge of nuclear energy

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.57(.15)	5.06(.13)	.49(.15)***
Netherlands	3.45(.15)	4.26(.13)	.81(.11)***
Canada	3.99(.19)	4.45(.15)	.47(.15)***
Scotland	3.64(.15)	4.54(.13)	.89(.15)***
ALL	3.87(.08)	4.51(.07)	.69(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.3 SELF-RATED KNOWLEDGE OF HYDRO-ELECTRIC

Participants tended to rate themselves as having a moderate level of knowledge of hydro-electric energy in both the pre- and post-workshop surveys. The mean knowledge ratings, shown in Apx Table A.6, were found to increase significantly in Australia, Netherlands and Scotland, whereas mean knowledge ratings in Canada remained almost unchanged throughout the workshop.

Apx Table A.6 Change in self-rated knowledge of hydro-electric

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.74(.15)	5.25(.15)	.51(.13)***
Netherlands	3.49(.14)	4.23(.12)	.74(.12)***
Canada	4.72(.15)	4.75(.14)	.03(.13)
Scotland	3.71(.16)	4.88(.12)	1.17(.15)***
ALL	4.09(.08)	4.74(.07)	.65(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.4 SELF-RATED KNOWLEDGE OF COAL

On average, self-rated knowledge of coal was rated as moderate by participants in each of the workshops, with slightly higher levels indicated by the Australian participants (M=5.02, SD=1.21). As shown in Apx Table A.7, this level of knowledge was seen to significantly increase in the workshops in Australia, the Netherlands and Scotland. Canadian participants tended to rate their knowledge of coal as slightly lower in the post-workshop survey, however this decrease was not significant.

Apx Table A.7 Change in self-rated knowledge of coal (traditional/current methods)

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	5.02(.13)	5.59(.12)	.57(.12)***
Netherlands	3.67(.14)	4.53(.11)	.86(.11)***
Canada	4.79(.16)	4.57(.15)	-.22(.13)
Scotland	4.16(.14)	4.93(.11)	.77(.15)***
ALL	4.34(.08)	4.88(.06)	.54(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.5 SELF-RATED KNOWLEDGE OF NATURAL GAS

Participants felt they had a moderate level of knowledge of natural gas. Canadian participants (M=5.05, SD=1.21) indicated the highest level of knowledge and Scottish participants (M=3.87, SD=1.42) indicated the lowest. The greatest increase was evident in the Scotland (difference between mean 1.01, p<0.01) workshop followed by the Netherlands and Australia. On the other hand, a slight decrease occurred in the Canada workshop (difference between means -.20, p<0.10.1).

Apx Table A.8 Change in self-rated knowledge of natural gas

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.78(.14)	5.38(.13)	.60(.12)***
Netherlands	3.94(.13)	4.90(.11)	.96(.11)***
Canada	5.05(.14)	4.86(.15)	-.20(.12)*
Scotland	3.87(.15)	4.88(.11)	1.01(.13)***
ALL	4.34(.07)	4.99(.06)	.65(.06)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests);

A.2.6 SELF-RATED KNOWLEDGE OF GEOTHERMAL ENERGY

Participants' self-rated knowledge of geothermal was initially low to moderate across the workshops. Over the course of the workshop knowledge levels greatly improved in Australia (difference between means 1.10, p<.01), the Netherlands (difference between means 1.38, p<.01) and particularly in Scotland (difference between means 2.04, p<.01), however changes were not significant in the Canada workshop.

Apx Table A.9 Change in self-rated knowledge of geothermal

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	3.73(.17)	4.83(.15)	1.10(.17)***
Netherlands	2.82(.14)	4.20(.13)	1.38(.14)***
Canada	3.72(.20)	4.00(.15)	.28(.18)
Scotland	2.19(.14)	4.24(.14)	2.04(.17)***
ALL	3.05(.09)	4.31(.07)	1.26(.09)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.7 SELF-RATED KNOWLEDGE OF SOLAR ENERGY

Participants' self-rated knowledge of solar energy was moderate to high in each of the workshops. Similar to the results for other energy technologies, significant increases in knowledge occurred in the workshops held in Australia (difference between means .64, p<.01), the Netherlands (difference between means .96, p<.01) and Scotland (difference between means 1.02, p<.01). In Canada, however knowledge ratings slightly decreased, although not significantly.

Apx Table A.10 Change in self-rated knowledge of solar

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	5.23(.12)	5.88(.10)	.64(.10)***
Netherlands	4.41(.13)	5.38(.10)	.96(.11)***
Canada	5.01(.15)	4.82(.16)	-.20(.13)
Scotland	4.20(.14)	5.22(.11)	1.02(.14)***
ALL	4.67(.07)	5.33(.06)	.66(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.8 SELF-RATED KNOWLEDGE OF BIOFUELS

Participants tended to rate their knowledge of biofuels as moderate, with slightly lower levels indicated by the Scottish participants (M=3.02, SD=1.69). As shown in

Apx Table A.11, following each of the workshops knowledge ratings for biofuels increased, however the changes in Canada were less significant.

Apx Table A.11 Change in self-rated knowledge of biofuels

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.39(.16)	4.86(.13)	.48(.15)***
Netherlands	3.66(.14)	4.48(.12)	.82(.12)***
Canada	4.12(.18)	4.44(.16)	.32(.17)*
Scotland	3.02(.17)	4.39(.14)	1.37(.18)***
ALL	3.75(.09)	4.53(.07)	.78(.08)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.9 SELF-RATED KNOWLEDGE OF OIL

Overall, self-rated knowledge levels for oil tended to be moderate, with Canadian participants (M=5.05, SD=1.30) indicating higher levels of knowledge, which remained relatively unchanged during the workshop. Whereas the knowledge level for oil in the other workshops, as shown in Apx Table A.12, significantly increased.

Apx Table A.12 Change in self-rated knowledge of oil

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.81(.15)	5.09(.13)	.27(.12)**
Netherlands	3.92(.13)	4.63(.11)	.71(.11)***
Canada	5.05(.15)	5.08(.14)	.03(.14)
Scotland	4.10(.15)	4.83(.11)	.73(.16)***
ALL	4.40(.08)	4.88(.06)	.47(.07)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.10 SELF-RATED KNOWLEDGE OF WAVE/TIDAL ENERGY

Participants in the Netherlands (M=2.66, SD=1.46) tended to rate their knowledge of wave/tidal energy as low, whereas participants in the other workshops indicated slightly higher levels of knowledge. Significant increases occurred across each of the workshops with the greatest change evident in Scotland workshop (difference between means 1.53, $p<0.01$).

Apx Table A.13 Change in self-rated knowledge of wave/tidal

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	4.01(.16)	5.04(.15)	1.03(.15)***
Netherlands	2.66(.14)	3.86(.13)	1.20(.14)***
Canada	3.54(.20)	3.86(.19)	.32(.15)**
Scotland	3.50(.16)	5.03(.12)	1.53(.18)***
ALL	3.37(.09)	4.43(.08)	1.06(.08)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.2.11 SELF-RATED KNOWLEDGE OF COAL SEAM GAS

With the exception of Canada, workshop participants were asked to rate their knowledge of coal seam gas. Knowledge levels were generally low in the Netherlands (M=2.95, SD=1.33) and Scotland (M=2.2, SD=1.47), but somewhat moderate in Australia (M=3.85, SD=1.64). In the post-workshop survey participants from each of these countries indicated their level of knowledge had improved for coal seam gas.

Apx Table A.14 Change in self-rated knowledge of coal seam gas

COUNTRY	MEAN PRE-TEST SCORE(S.E.)	MEAN POST-TEST SCORE(S.E.)	MEAN DIFF.(S.E.)
Australia	3.85(.18)	4.75(.14)	.90(.16)***
Netherlands	2.95(.13)	4.20(.11)	1.25(.11)***
Canada	--	--	--
Scotland	2.20(.15)	3.60(.16)	1.40(.17)***
ALL	2.96(.09)	4.16(.08)	1.20(.09)***

Note: Paired t-tests of mean difference; knowledge ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.3 Result tables for attitude towards energy sources and related technologies

A.3.1 RENEWABLE ENERGY AND FOSSIL FUELS

Apx Table A.15 Change in attitude toward renewable energy sources/technologies

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.78(.08)	5.80(.08)	.02(.07)
Netherlands	5.81(.07)	5.60(.08)	-.20(.07)***
Canada	5.48(.09)	5.17(.11)	-.31(.09)***
Scotland	5.45(.09)	5.90(.08)	.45(.10)***
ALL	5.64(.04)	5.64(.04)	.00(.04)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests) :. Energy sources/technologies deemed "renewables" for this purpose are wind, hydro-electric, geothermal, solar, biofuels, and wave/tidal.

Apx Table A.16 Change in attitude toward fossil fuel energy sources/technologies

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.18(.14)	4.28(.15)	.10(.09)
Netherlands	4.04(.12)	4.25(.11)	.21(.09)**
Canada	4.22(.13)	4.45(.14)	.23(.11)**
Scotland	3.81(.12)	4.15(.13)	.35(.11)***
ALL	4.05(.06)	4.27(.07)	.23(.05)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests) :. Energy sources/technologies deemed **"fossil fuels" for this purpose are coal (traditional/current methods), gas and oil.**

Apx Table A.17 Change in preference for renewable over fossil fuel energy sources/technologies

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	1.60(.15)	1.52(.16)	-.08(.11)
Netherlands	1.77(.13)	1.35(.13)	-.42(.10)***
Canada	1.26(.16)	0.72(.18)	-.54(.12)***
Scotland	1.65(.14)	1.75(.14)	.10(.12)
ALL	1.59(.07)	1.36(.08)	-.23(.06)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests) :. **Energy sources/technologies deemed "renewables" for this purpose are wind, hydro-electric, geothermal, solar, biofuels, and wave/tidal; "fossil fuels" are coal (traditional/current methods), gas and oil.**

A.3.2 ATTITUDE TOWARD WIND AND SOLAR ENERGY

Participants expressed the highest levels of support towards wind and solar energy across each workshop. However, the changes that occurred during the workshop varied. In Australia there was a slight increase in support for both wind and solar energy. In contrast, wind and solar energy lost significant support from participants in Canada during the workshop. The variation was different again in the Netherlands where support for wind and solar did not significantly change between the start and end of the workshop. In Scotland the level of agreement with wind increased, while support for solar energy remained at a similar level.

Apx Table A.18 Change in attitude toward wind energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.96(.16)	6.12(.15)	.16(.09)*
Netherlands	6.20(.10)	6.25(.09)	.05(.08)
Canada	6.09(.15)	5.73(.15)	-.36(.15)**
Scotland	5.81(.14)	6.53(.08)	.71(.13)***
ALL	6.02(.07)	6.18(.06)	.16(.06)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests) :

Apx Table A.19 Change in attitude toward solar energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.52(.10)	6.63(.08)	.11(.06)*
Netherlands	6.59(.07)	6.48(.10)	-.11(.09)
Canada	6.30(.11)	5.75(.16)	-.55(.15)***
Scotland	6.14(.11)	6.26(.10)	.11(.13)
ALL	6.39(.05)	6.30(.06)	-.09(.06)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

A.3.3 ATTITUDE TOWARD HYDRO-ELECTRIC

Hydro-electric, another renewable energy source, received the next highest level of support, with mean scores of moderate agreement. The change in this opinion varied across each country. Following the workshop, participants in Australia (difference between means -.29, p<.01) and the Netherlands (difference between means -.53, p<.01) were found to be less supportive. In Scotland there was greater agreement with its use, while Canada did not significantly shift in attitude towards hydro-electric.

Apx Table A.20 Change in attitude toward hydro-electric

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.82(.12)	5.52(.16)	-.29(.14)**
Netherlands	6.04(.10)	5.50(.13)	-.53(.10)***
Canada	5.42(.16)	5.50(.17)	.08(.17)
Scotland	5.55(.13)	6.00(.11)	.45(.13)***
ALL	5.73(.06)	5.64(.07)	-.09(.07)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.3.4 ATTITUDE TOWARD WAVE/TIDAL ENERGY

Participants also demonstrated strong support for wave/tidal energy, with some shifts in the mean level of agreement. Following the workshop, participants from both the Netherlands (difference between means -.26, p<.05) and Canada (difference between means -.48, p<.01) significantly decreased their support of the use of wave/tidal energy. In comparison, the mean level of agreement was significantly higher in Scotland as a result of the workshop (difference between means .55, p<.01).

Apx Table A.21 Change in attitude toward wave/tidal energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.85(.14)	5.89(.13)	.04(.14)
Netherlands	5.41(.13)	5.14(.13)	-.26(.12)**
Canada	5.39(.16)	4.91(.18)	-.48(.15)***
Scotland	5.92(.12)	6.46(.08)	.55(.12)***
ALL	5.65(.07)	5.61(.07)	-.03(.07)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

A.3.5 ATTITUDE TOWARD GEOTHERMAL ENERGY

Overall, participants were moderately favourable towards geothermal energy. There were some significant shifts in attitude, with support lost in the Canada workshop (difference between means -.5, p<.01), whereas participants in Scotland (difference between means .49, p<.01) increased their level of agreement with the use of geothermal. However, participants in Australia and the Netherlands did not change their views significantly towards geothermal.

Apx Table A.22 Change in attitude toward geothermal energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.52(.13)	5.64(.13)	.12(.14)
Netherlands	5.47(.13)	5.52(.12)	.06(.13)
Canada	5.38(.16)	4.78(.16)	-.50(.16)***
Scotland	4.71(.13)	5.20(.15)	.49(.10)***
ALL	5.24(.07)	5.31(.07)	.07(.07)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

A.3.6 ATTITUDE TOWARD NATURAL GAS

Of the fossil fuels (coal, oil and natural gas), natural gas was attributed the highest level of support from participants. Attitudes towards natural gas changed very little as result of the workshop, with only a slight increase seen in the Netherlands (difference between means .24, p<.10).

Apx Table A.23 Change in attitude toward natural gas

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.11(.14)	5.26(.15)	.15(.15)
Netherlands	4.68(.14)	4.93(.13)	.24(.12)*
Canada	5.07(.15)	5.04(.16)	-.03(.15)
Scotland	4.54(.15)	4.75(.15)	.22(.17)
ALL	4.82(.07)	4.98(.07)	.16(.07)**

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests

A.3.7 ATTITUDE TOWARD BIOFUELS

Overall, support for biofuels was the lowest out of the renewable energy sources, with participants tending to be unsure or agreeing moderately with its use. As shown in Apx Table A.24 support for biofuels was found to decrease significantly amongst participants in the Netherlands (difference between means -.41, p<.01), and increase in the Scotland workshop (difference between means .4, p<.05). Attitudes of Australian and Canadian participants, however, did not significantly change.

Apx Table A.24 Change in attitude toward biofuels

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.05(.17)	5.05(.14)	.00(.15)
Netherlands	5.18(.15)	4.77(.14)	-.41(.13)***
Canada	4.47(.17)	4.37(.16)	-.11(.16)
Scotland	4.57(.16)	4.97(.15)	.40(.16)**
ALL	4.84(.08)	4.80(.07)	-.04(.07)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

A.3.8 ATTITUDE TOWARD NUCLEAR ENERGY

There were a range of views expressed in regard to the use of nuclear energy, with participants somewhat polarised on the issue. On average however, initial results from the Netherlands, Canada and Scotland indicated disagreement with nuclear energy, while Australian participants tended to be unsure. Opinion shifted in different directions across the workshops. Support for nuclear energy was found to significantly increase after the workshops in Australia (difference between means .43, p<.01) and Canada (difference between means .95, p<.01). The opinion of participants towards nuclear energy in the Netherlands and Scotland remained relatively unchanged.

Apx Table A.25 Change in attitude toward nuclear energy

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.31(.22)	4.74(.21)	.43(.13)***
Netherlands	3.67(.19)	3.77(.18)	.10(.13)
Canada	3.80(.21)	4.75(.22)	.95(.19)***
Scotland	3.72(.19)	3.88(.18)	.15(.14)
ALL	3.85(.10)	4.22(.10)	.37(.07)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests.

A.3.9 ATTITUDE TOWARD NATURAL GAS

Of the fossil fuels (coal, oil and natural gas), natural gas was attributed the highest level of support from participants. Attitudes towards natural gas changed very little as result of the workshop, with only a slight increase seen in the Netherlands (difference between means .24, p<.10).

Apx Table A.26 Change in attitude toward natural gas

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.11(.14)	5.26(.15)	.15(.15)
Netherlands	4.68(.14)	4.93(.13)	.24(.12)*
Canada	5.07(.15)	5.04(.16)	-.03(.15)
Scotland	4.54(.15)	4.75(.15)	.22(.17)
ALL	4.82(.07)	4.98(.07)	.16(.07)**

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

A.3.10 ATTITUDE TOWARD COAL AND OIL

As shown, in Apx Table A.27 and Apx Table A.28, support for the use of coal and oil ranged from moderate disagreement to unsure in both the pre-and post-workshop surveys. Participants agreed least with the use of coal out of the technologies and there was very little shift in this attitude. Only Scottish participants became more supportive (difference between means .46, p<.01). Attitudes towards oil experienced a greater shift in support; significantly increasing in the Netherlands (difference between means .3, p<.05), Canada (difference between means .48, p<.01) and Scotland (difference between means .35, p<.05).

Apx Table A.27 Change in attitude toward coal (traditional/current methods)

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	3.73(.18)	3.89(.20)	.16(.13)
Netherlands	3.48(.14)	3.61(.14)	.13(.14)
Canada	3.56(.17)	3.79(.16)	.23(.17)
Scotland	3.41(.15)	3.86(.16)	.46(.14)***
ALL	3.53(.08)	3.78(.08)	.25(.07)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests):

Apx Table A.28 Change in attitude toward oil

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	3.70(.18)	3.68(.18)	-.01(.12)
Netherlands	3.94(.14)	4.23(.13)	.30(.12)**
Canada	4.09(.17)	4.57(.16)	.48(.15)***
Scotland	3.53(.15)	3.88(.16)	.35(.15)**
ALL	3.81(.08)	4.09(.08)	.28(.07)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.3.11 ATTITUDE TOWARD COAL SEAM GAS

Coal seam gas attracted some of the lowest levels of support, with participants moderately disagreeing with this energy source. These results exclude Canada as coal seam gas was not included amongst the energy sources and related technologies at this workshop. The mean levels of agreement remained low throughout the workshop with no significant changes occurring.

Apx Table A.29 Change in attitude toward coal seam gas

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	3.96(.18)	3.98(.19)	.01(.11)
Netherlands	3.51(.14)	3.73(.13)	.22(.14)
Canada	--	--	--
Scotland	3.87(.10)	3.99(.13)	.12(.12)
ALL	3.76(.08)	3.89(.08)	.13(.07)*

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

A.4 Energy preferences

A.4.1 RENEWABLE ENERGY AND FOSSIL FUELS

Apx Table A.30 Change in priority ranking of renewable energy sources/technologies for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.02(.14)	5.13(.12)	.11(.10)
Netherlands	4.66(.12)	4.77(.12)	.11(.11)
Canada	4.90(.15)	5.54(.15)	.63(.18)***
Scotland	4.82(.11)	4.49(.10)	-.33(.10)***
ALL	4.83(.07)	4.94(.07)	.11(.06)*

Note: Paired t-tests of mean difference; ranking of energy sources/technologies ranges from 1-12 (highest to lowest priority); ***p < .01, ** p < .05, * p < .10 (two-tailed tests); Energy sources/technologies deemed "renewables" for this purpose are wind, hydro-electric, geothermal, solar, biofuels, and wave/tidal. Note that higher scores mean lower ranking.

Apx Table A.31 Change in priority ranking of fossil fuel energy sources/technologies for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.99(.36)	6.37(.40)	-.62(.45)
Netherlands	7.82(.25)	8.46(.29)	.64(.34)*
Canada	6.18(.35)	4.81(.36)	-1.38(.39)***
Scotland	6.56(.29)	8.08(.31)	1.52(.41)***
ALL	6.97(.16)	7.14(.18)	.17(.21)

Note: Paired t-tests of mean difference; ranking of energy sources/technologies ranges from 1-12 (highest to lowest priority); ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Energy sources/technologies deemed "fossil fuels" for this purpose are coal (traditional/current methods), gas and oil. Note that higher scores mean lower ranking.**

Apx Table A.32 Change in priority ranking of renewable over fossil fuel energy sources/technologies for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	3.06(.32)	3.29(.29)	.23(.21)
Netherlands	3.45(.26)	2.99(.25)	-.46(.21)**
Canada	2.36(.32)	1.54(.35)	-.81(.38)**
Scotland	3.58(.26)	3.91(.25)	.32(.22)
ALL	3.17(.14)	2.99(.15)	-.18(.13)

Note: Paired t-tests of mean difference; ranking of energy sources/technologies ranges from 1-12 (highest to lowest priority); ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Energy sources/technologies deemed "renewables" for this purpose are wind, hydro-electric, geothermal, solar, biofuels, and wave/tidal; "fossil fuels" are coal (traditional/current methods), gas and oil.**

A.4.2 PREFERENCE FOR SOLAR AND WIND ENERGY

Solar and wind energy had the highest mean rankings for funding priority across each of the workshops. The main change with regards to the ranking of solar occurred in Canada where the preference towards solar decreased (difference between means 1.16, p<.01). On the other hand, in the Netherlands participants increased their ranking of solar (difference between means -.38, p<.1). The mean funding priority for wind stayed relatively the same, with only Scottish participants becoming significantly more favourable of the allocation of public funds toward the technology (difference between means -1.01, p<.01).

Apx Table A.33 Change in priority ranking of solar energy for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	2.55(.30)	2.40(.26)	-.15(.27)
Netherlands	2.69(.27)	2.31(.27)	-.38(.23)*
Canada	3.06(.27)	4.21(.33)	1.16(.32)***
Scotland	3.36(.26)	3.85(.22)	.48(.31)
ALL	2.91(.14)	3.11(.14)	.21(.14)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests. **Note that higher scores mean lower ranking.**

Apx Table A.34 Change in priority ranking of wind energy for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	4.01(.33)	3.94(.28)	-.08(.26)
Netherlands	3.05(.25)	2.98(.24)	-.06(.23)
Canada	3.14(.28)	3.54(.32)	.39(.33)
Scotland	2.89(.21)	1.88(.16)	-1.01(.24)***
ALL	3.24(.14)	3.03(.13)	-.21(.13)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.3 PREFERENCE FOR HYDRO-ELECTRIC AND WAVE/TIDAL

After solar and wind, the next highest priorities for the allocation of public funds were hydro-electric and wave/tidal. The mean rankings for these sources were generally in the mid-range; except in Scotland where the preference for wave/tidal was higher than the other countries – this is not surprising given that Scotland is seen to be a world leader in this technology. Changes in the preference toward hydro-electric were only slight. The mean priority ranking improved in Canada (difference between means -.62, p<.05) during the workshop, but slightly decreased in Australia (difference between means .54, p<.10). For wave/tidal, significant shifts in funding priority were evident in Canada and Scotland. Canadian participants showed less preference for wave/tidal (difference between means 1.19, p<.01) while Scottish participants increasingly prioritised the allocation of funding to this technology difference between means -.91, p<.01).

Apx Table A.35 Change in priority ranking of hydro-electric for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.47(.30)	6.01(.33)	.54(.31)*
Netherlands	4.77(.25)	5.04(.22)	.27(.23)
Canada	4.86(.24)	4.23(.25)	-.62(.28)**
Scotland	4.50(.28)	4.80(.25)	.30(.32)
ALL	4.88(.14)	5.04(.13)	.16(.14)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

Apx Table A.36 Change in priority ranking of wave/tidal for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.53(.29)	5.19(.28)	-.34(.34)
Netherlands	5.69(.27)	6.09(.26)	.40(.31)
Canada	6.49(.37)	7.67(.34)	1.19(.33)***
Scotland	3.68(.27)	2.77(.22)	-.91(.27)***
ALL	5.29(.16)	5.34(.16)	.05(.16)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.4 PREFERENCE FOR GEOTHERMAL AND BIOFUELS

The mean funding priority rankings for geothermal and biofuels tended to also fall in the mid-range, from approximately 5th to 7th top priority. The results in Apx Table A.37 show the mean rankings for geothermal hardly changed in the Australia and Netherlands workshops, whereas there were significant shifts for Canada and Scotland. Canadian participants ranked geothermal significantly lower as a funding priority (difference between means 1.19, p<.01) than what they had previously in the pre-workshop survey. Whereas in Scotland, participants showed greater preference towards geothermal (difference between means -.74, p<.01) following the workshop. Participants prioritised the funding of biofuels at a similar level in each of the workshops. However, preference toward biofuels only decreased significantly in Australia (difference between means .59, p<.10) and the Netherlands (difference between means .75, p<.01).

Apx Table A.37 Change in priority ranking of geothermal for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	5.96(.33)	6.15(.32)	.19(.35)
Netherlands	5.79(.25)	5.52(.25)	-.27(.29)
Canada	5.15(.31)	7.04(.28)	1.89(.31)***
Scotland	7.71(.28)	6.97(.27)	-.74(.28)***
ALL	6.21(.15)	6.35(.14)	.14(.16)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).

Apx Table A.38 Change in priority ranking of biofuels for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.53(.27)	7.13(.28)	.59(.13)*
Netherlands	5.93(.25)	6.68(.22)	.75(.25)***
Canada	6.90(.29)	7.28(.29)	.39(.33)
Scotland	6.81(.28)	6.67(.25)	-.14(.30)
ALL	6.49(.14)	6.90(.13)	.41(.15)###

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.5 PREFERENCE FOR NATURAL GAS

Similar to the results for attitude, natural gas was the most preferred energy source out of the fossil fuels. The mean ranking of natural gas as a funding priority tended to remain at a steady level before and after the workshop. The only significant change came about in the Netherlands, where the mean funding priority ranking improved (difference between means -.78, p<.01). In the overall results described earlier, following the workshop, natural gas was shown to have a greater funding priority ranking than both geothermal and biofuels.

Apx Table A.39 Change in priority ranking of natural gas for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.40(.30)	6.44(.31)	.04(.31)
Netherlands	6.89(.21)	6.10(.24)	-.78(.26)***
Canada	5.97(.32)	5.84(.28)	-.13(.31)
Scotland	6.67(.27)	6.90(.26)	.23(.27)
ALL	6.54(.13)	6.34(.14)	-.20(.14)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests).. **Note that higher scores mean lower ranking.**

A.4.6 PREFERENCE FOR NUCLEAR

Apx Table A.40 Change in priority ranking of nuclear for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	6.85(.44)	6.37(.44)	-.48(.34)
Netherlands	8.59(.37)	7.94(.38)	-.64(.29)**
Canada	7.65(.42)	5.23(.44)	-2.42(.41)***
Scotland	8.01(.38)	8.20(.35)	.19(.32)
ALL	7.85(.20)	7.09(.21)	-.76(.17)***

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.7 PREFERENCE FOR OIL

Apx Table A.41 Change in priority ranking of oil for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	8.78(.26)	9.44(.23)	.65(.27)**
Netherlands	8.19(.25)	7.97(.23)	-.22(.22)
Canada	7.80(.34)	7.74(.30)	-.06(.37)
Scotland	9.10(.25)	9.23(.23)	.13(.28)
ALL	8.49(.14)	8.59(.13)	.10(.14)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.8 PREFERENCE FOR COAL SEAM GAS

Apx Table A.42 Change in priority ranking of coal seam gas for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	8.91(.30)	8.57(.28)	-.34(.29)
Netherlands	8.93(.24)	9.41(.21)	.49(.27)*
Canada	--	--	--
Scotland	9.21(.22)	9.59(.21)	.38(.25)
ALL	9.01(.14)	9.23(.13)	.22(.16)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests). **Note that higher scores mean lower ranking.**

A.4.9 PREFERENCE FOR COAL (TRADITIONAL/CURRENT METHODS)

Apx Table A.43 Change in priority ranking of coal (traditional/current methods) for public funding

COUNTRY	MEAN PRE-TEST SCORE (S.E.)	MEAN POST-TEST SCORE (S.E)	MEAN DIFF. (S.E.)
Australia	9.11(.35)	9.34(.33)	.23(.33)
Netherlands	9.19(.26)	9.18(.23)	-.01(.24)
Canada	8.27(.30)	7.81(.35)	-.46(.39)
Scotland	9.44(.27)	9.05(.24)	-.38(.30)
ALL	9.05(.15)	8.91(.14)	-.14(.15)

Note: Paired t-tests of mean difference; attitude ranges from 1-7; ***p < .01, ** p < .05, * p < .10 (two-tailed tests. **Note that higher scores mean lower ranking.**

Appendix B Key workshop questions

The key themes of questions regarding CCS that arose during the workshops are listed below.

- Storage security – How long will the CO_2 stay underground? Is it permanent?
- Storage site location – Where will the CO_2 be stored?
- Impacts of CO_2 storage – Will the stored CO_2 effect groundwater? Will the pressure build up underground?
- Risk of CO_2 leakage – Could the CO_2 escape? Could earthquakes cause leakage? How could leakage be stopped?
- Effects of leakage – What would happen if the CO_2 leakage occurred? Would there be adverse effects on the environment and human health?
- Uncertainties about the technology – how do we know CCS is going to work? Has CCS been done before?
- Monitoring systems – How will the CO_2 be monitored? How accurate will monitoring be?
- Economic concerns – What the upfront costs for implementation? How does the cost of CCS compare to other low emission technologies? Are there long term benefits for investing in CCS?
- Justification of CCS – Why should CCS be implemented when non-CO_2 emitting technologies are available, such as renewable energy? Isn't CCS an interim solution?
- Alternatives to CCS – Are there other ways to reduce CO_2 emissions? Could the CO_2 be used as resource rather than stored underground?
- Infrastructure and transport – What infrastructure is required? How will the CO_2 be transported?
- Timeframe for CCS – How long does it take to get a site operational? Why has CCS been delayed?

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CONTACT US

t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

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FOR FURTHER INFORMATION

CSIRO Earth Science and Resource Engineering
Peta Ashworth
t +61 7 3327 4145
e peta.ashworth@csiro.au