Public views on low-carbon heat technologies

Report of the Sciencewise Sounding Board pilot

March 2016

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The report is entitled: 'Public views on low-carbon heat technologies'.

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Executive summary

Sciencewise engaged 17 members of the public from across the UK in an online conversation with analysts at the Committee on Climate Change (CCC), an independent statutory body tasked with advising the government on how to reduce carbon emissions. Participants were asked about the non-financial barriers that may affect the uptake of low-carbon heat technologies, such as heat pumps and heat networks, as well as what they thought some of the solutions to those barriers might be. This was explored through the use of scenarios, participant polling and reflection upon participant polling.

Recruitment of the participant pool was limited to those living in urban, suburban or metropolitan areas, and the low-carbon heat technologies discussed were those that could operate in urban, suburban and metropolitan areas. Around half of participants were homeowners.

Given the small sample size, results should **not** be interpreted as representative of the public at large. Rather, the Sounding Board provides an insight into the range of public views, experiences and perspectives on the issues at hand.

Polling of the participants showed that they were generally open to considering alternative low-carbon heat technologies, both in their own homes and when moving homes, assuming that cost was not an issue. Participants also raised a number of concerns and areas where they would seek further information and reassurance:

- **Hidden costs:** Participants asked about the cost of maintenance and repair, as well as incidental costs including the cost of underfloor heating, or installing new radiators.
- **Reliability:** Participants raised a range of issues related to reliability including the importance of easy access to maintenance services, back-up systems, and concerns about the interdependence of heating systems across a network.
- **Flexibility and ease of use:** Participants questioned whether the technologies discussed would meet the particular needs of their households, provide sufficient levels of control and be easy to use.
- **Long-term financial and sustainability implications**: Participants questioned whether the technologies discussed would still be cost-effective and/or energy efficient in the future.
- **Household disruption:** Participants raised concerns around disruption as a result of installing the new technologies, and asked about the timescale for installation.
- **Noise pollution:** Participants asked about noise interference within the home and about whether the wider community could be affected through noise pollution.
- **Impact on the neighbourhood:** Participants asked about whether planning permission may be necessary, or whether the roads may need to be dug up for installation.
- **Suitability of the home**: Participants questioned whether the technology concerned was suited to their homes, including whether it could be made available in their location and whether retrofit was realistic or feasible.

Participants were divided over whether they would be prepared to accept for their choice of heating technology to be limited in exchange for a long-term reduction in their heating bills. Many participants identified benefits from constrained choice, including reduced costs, ease of support for maintenance issues and environmental benefits. However, some participants expressed discomfort at having their freedom of choice constrained as a matter of principle.

Participants felt there was a strong role for government and business in leading adoption of low-carbon heat technologies. They also raised the following policy priorities:

- Incentives, subsidies and support
- Education, information and independent advice
- Accreditation and quality assurance
- Corporate social responsibility.

Both post-deliberation polling and feedback from the discussions showed participants felt an important consideration for policymakers was the distinction between retrofitting homes with low-carbon heat technologies and considering low-carbon heat technologies for new-build, with participants reflecting that the higher suitability of new properties supported the case for additional targeting of these compared to current policy.

Background

About the Sounding Board

The Sounding Board is Sciencewise's new tool for gaining rapid deliberative public input on challenging issues involving science and technology. Sciencewise circulates materials to the groups in advance, and then facilitates an online discussion between policymakers and participants to gather an understanding of public views on the topic in question. Sciencewise guidance indicates that it is most appropriate to use the Sounding Board when time and resourcing constraints are faced that rule out more in-depth deliberative public engagement processes.

This Sounding Board project is the second of two pilots delivered by Sciencewise. Participants for this Sounding Board were selected in two ways. The first cohort of participants were selected from a pool of registered members of the public, all of whom had previously taken part in a Sciencewise dialogue. The second cohort of participants were sampled by a market research company from a pre-existing database. Both cohorts of participants were selected using stratified random sampling on the basis of demographic characteristics including age, gender, geographical location and educational background.

Objective for policymakers

This project aimed to engage a small sample of homeowners and renters across the UK living within urban, suburban or metropolitan areas in informed discussion about:

- the potential for uptake of low-carbon heating technologies (including heat networks and heat pumps)
- any barriers to uptake, and
- what potential solutions to those barriers might be.

The project also aimed to explore with participants the role that government could play in supporting the public to reduce carbon emissions from heating.

Findings from the Sounding Board project will form part of the Committee on Climate Change's evidence base for advice to the UK government on low-carbon heating.

Design and structure of the Sounding Board

Sciencewise designed and ran four online workshops involving 17 participants from a broad range of age groups, geographical locations and educational backgrounds. [1] All Sounding Board participants were members of the public with no prior knowledge of the policy area, although 11 out of the 17 participants had prior experience participating in a previous Sciencewise dialogue. Participants were divided up into two cohorts that met twice, attending an information session introducing low-carbon heat technologies and climate change policy, and a longer deliberative session with more time for public input.

[1] Seventeen members of the public in total participated in the Sounding Board project as a whole. But each individual session had sixteen participants in total as one participant dropped out of the first information session and one participant dropped out of the second deliberative session. Further detail on the demographic make-up of the sample is included within the Annex (Section 1) of this report.

1. **Information session**

The information session gave participants the opportunity to familiarise themselves with the Sounding Board online platform. This session also allowed a senior policy analyst from the Committee on Climate Change to inform participants about relevant low-carbon heat technologies and the UK's emissions reduction objectives. Participants had the opportunity to ask clarifying questions, and to provide initial thoughts on the issues at hand.

2. **Deliberative workshops**

Sciencewise reconvened the two cohorts of participants to explore their views in greater depth. This took the form of a structured deliberative conversation over a period of 90 minutes which explored the following areas:

- Participant views on a scenario about moving to a low-carbon district heating zone.
- Participant views on a scenario about replacing their existing heating system with a heat pump.
- Participant views about the potential trade-offs between choice and cost of heating technologies.
- Participant views about how the government could support better uptake of low-carbon heat technologies.

3. **Information tools and techniques**

A range of information tools were used to engage participants with the issues:

- **Written briefing materials:** All participants were given a short written briefing on the policy issues in advance of the Sounding Board workshops.
- **Presentations:** The senior analyst from the CCC delivered Powerpoint presentations about specific aspects of the policy area over the Sounding Board online platform.
- **Conversation and Q&A:** Participants were able to directly engage with policymakers and other participants over the online platform, with time set aside for Q&A. Participants responded to discussion questions 'around the table', allowing for time to be set aside for each participant to contribute their thoughts, as other participants listened and waited for their turn to contribute. This ensured that each participant had an equal chance to contribute views.
- **Polling and reflection on polling results:** Participants were polled at stages throughout the workshops, and the results from this polling were used to prompt wider discussion and reflection.

All of the materials used and created throughout the workshops can be found within the Annex of this report.

4. **Managing bias and testing materials**

All written materials for the discussion were reviewed by two experts independent of Sciencewise for bias and inaccuracies, and suggested amendments were incorporated into the written materials before the sessions. Our independent experts for this project were:

- **Dr. Catherine Cherry, a Research Associate at Cardiff University's School of Psychology.** Dr. Cherry's research aims to gain an understanding of the different ways in which knowledge

and concepts surrounding the reduction of carbon emissions within the home are understood by both policy makers and the public and to consider how progress can be made towards achieving sustainability in the UK housing sector.

- **Dr. Darrick Evensen, a postdoctoral researcher at Cardiff University's School of Psychology.** Dr. Evensen's research predominantly focuses on public perceptions of, and reactions to controversial energy and environment issues. Research interests include the public perceptions and social representations of unconventional energy development, the ethics of energy development, and perceptions of how to best transition to a less carbon-intensive energy system (including acceptability of associated costs).

Interpretation of results

Given the small sample size, the results of the Sounding Board should not be interpreted as representative of the views of the public at large. Rather the value of this form of deliberative engagement lies in opening up the policy process to input from a broad range of perspectives.

This can assist policymakers to test whether they have correctly understood the range of relevant issues, and to identify additional benefits, or questions and concerns which may need to be addressed. The views of all participants are summarised and represented in the report.

Where a view was a common theme, we refer to this view as being held by 'many' participants. When a view was echoed on a number of occasions, we refer to this as 'some' participants. We point out when a point was made by a single participant only.

Policymakers should be particularly careful regarding interpretation of these results in two instances:

- When issues are raised, or strong views held, by only a small minority of participants. This should *not* be seen as indicative that an issue is likely to be unimportant to the general public or ignored in wider public debate. This may not be the case, with views held by a larger group of the public as a whole. It may also be the case that an issue with only minority support plays a prominent role in public debate, as it is championed by influential interest groups.

- When technical or complex areas are discussed, and participants may not yet have fully developed views. Members of the public form judgements on the basis of information provided, but are not technical experts. Their views may shift as other considerations are raised by expert scrutiny of issues over the course of public debate. Policymakers should therefore be cautious to interpret initial judgements as fixed.

As the project aimed to explore the **non-financial barriers** to uptake of low-carbon heat technology as well as solutions to those barriers, participants were asked to assume the costs of installation and running the technologies were the same as existing gas and electric technologies. Any citations or interpretations of findings should therefore bear this framing in mind.

Findings from the Sounding Board

Results from the pre-session survey

Sciencewise asked all participants to undertake a pre-session survey to better understand their current feelings about climate change and its impacts, their existing heating arrangements, as well as their current housing arrangements.

- **Attitudes towards climate change and its impacts:** Many participants said that they were concerned about climate change and its impacts. Some participants said that they were 'slightly concerned', and some participants also said that they were 'extremely concerned'. None of the participants said that they were 'not really concerned', or 'not concerned at all.' (Figure 1).

- **Participants' current heating systems:** Many participants used a gas boiler. The remaining two participants who answered the question used electric heating – one used storage electric heating, and the other used non-storage electric heating. (Figure 2).

- **Participants' housing arrangements:** The largest group of participants recruited for this study were homeowners. The next largest group of participants were private renters. Two participants were living with family or friends, and one participant was living in socially rented accommodation. (Figure 3).

Figure 1: Attitudes towards climate change and its impacts

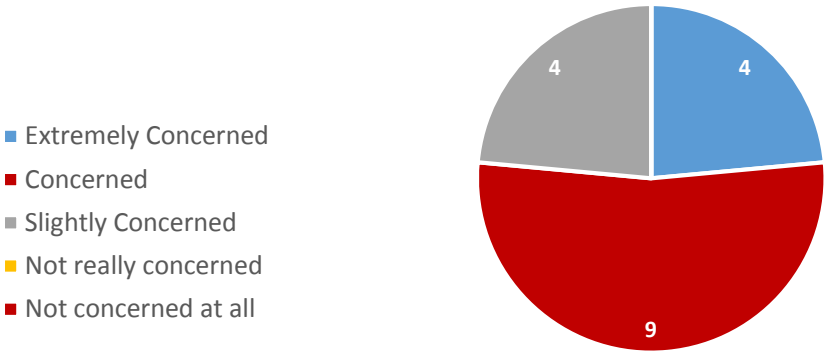


Figure 2: Which of these best describes your current heating system?

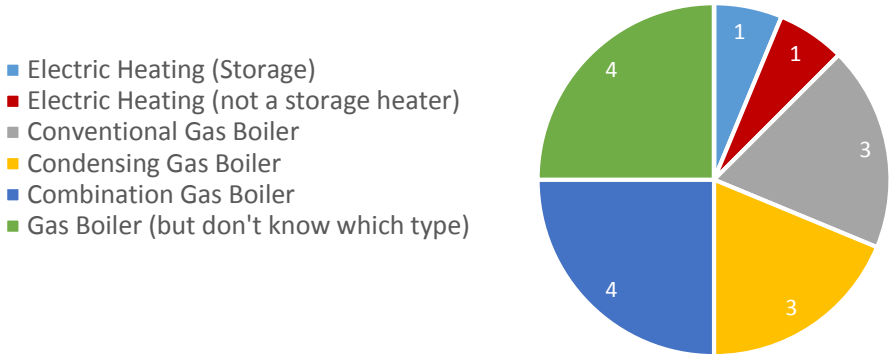
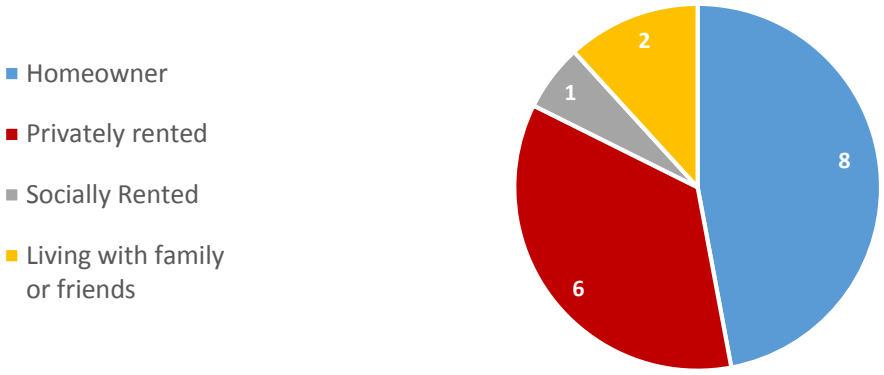


Figure 3: Participants' housing arrangements



Information session: Initial views of participants

At the beginning of the information session, participants were introduced to the objectives of the Sounding Board project. They were then asked the following question before any further information about a range of low-carbon heating systems was provided*: 'When it comes to replacing your heating system (or choosing a new heating system), what sort of things do you consider in the decision?'*

Participants identified the following issues:

- **Cost:** Many participants singled out the issue of cost. Participants distinguished different costs that may be relevant, including installation costs, running costs and maintenance costs. Some participants highlighted the importance of cost in the context of existing financial pressures and constraints on time; '*how much it is going to cost was important, as I am a full-time mum to two special needs children'*.

- **Efficiency**: Many participants also raised the importance of an efficient heating system. One participant said that their household had replaced their heating system within the past year, and chose a gas condensing boiler '*as we knew it was the most efficient'*.

- **Environmental impact**: Some participants said that they would consider the impact various heating systems had on the environment; '*I'd be looking for an energy efficient heating system and boiler, while at the same time looking to take into consideration the world environment*'. One participant explicitly mentioned renewable energy sources, referring to heat networks, and another participant explicitly mentioned the importance of low-carbon heating.

- **Flexibility:** Some participants said that flexibility of the heating system was important to them. They described considerations such as the ability to control the temperature, and one participant said that they had changed their heating system from a storage system because they '*had to have something more flexible and suited to our lifestyle'*. Another participant said that the ability to have different temperatures in different rooms was important to her as her 85 year old mother-in-law was living with her. One participant also said that the ability to control the heating system with their phone would be something they would consider.

- **Innovation**: A participant also highlighted that they would consider an '*intelligent and innovative system'* that used other features of their home effectively (for instance, under-floor heating and/or insulation).

- **Reliability:** Some participants also raised the importance of a reliable and effective heating system, noting that stability and the quality of the heating system was an important consideration.

- **Safety:** Two participants felt that safety was a relevant factor and cited the need for quality assurance about the heating system; 'I would want to know that the system is safe'.

- **Longevity:** Some participants raised the importance of the system's longevity. These included broader concerns about ensuring that the system kept up with the development of technology. One participant said that knowing that the system was 'fit for the future' was important.

- **Ease of installation and use:** One participant said that they would consider ease of use and ease of installation when selecting or replacing a heating system.

Low-carbon heat technologies – an introduction

Participants were then introduced by a senior policy analyst at the Committee on Climate Change to some alternative low-carbon heating systems, and were informed about how they compared to gas and electric heating systems. The following table outlines the information that was provided at this stage, alongside a verbal description of the technologies themselves.

Table 1:

Gas boilers	Can provide all your central heating and hot water Example – 3 bed semi-detached home Capital Cost – around £2000 Running Cost – around £700 a year
Electric Heating	Can provide all your central heating and hot water Storage heaters/ Air or oil heaters/ Electric boiler Carbon emissions depend on power sector Example – 3-bed semi-detached home: Capital cost: Low (around £100 - £2000) Running cost: High (around £1000 – 1500)
Heat Pumps **('A Fridge in Reverse')**	**Air source heat pumps:** 2-3 units of heat for every unit of electricity Basic home insulation is required and a radiator upgrade may be needed. Space/noise. Capital cost – around £7000 - £8000 for a 3 bedroom home. Running cost – similar to gas heating, lower for more efficient systems (about £500 - £600) **Ground source heat pumps:** More efficient. Higher capital costs and lower running costs
Low-carbon heat networks	A heat network provides **heat generated from a local source to more than one building or home via a network of pipes.** - Householders can control when the heating comes on and the temperature - The control unit would take up less space than a standard boiler - Costs: Designed to be lower than gas heating overall, including the capital costs of the gas boiler

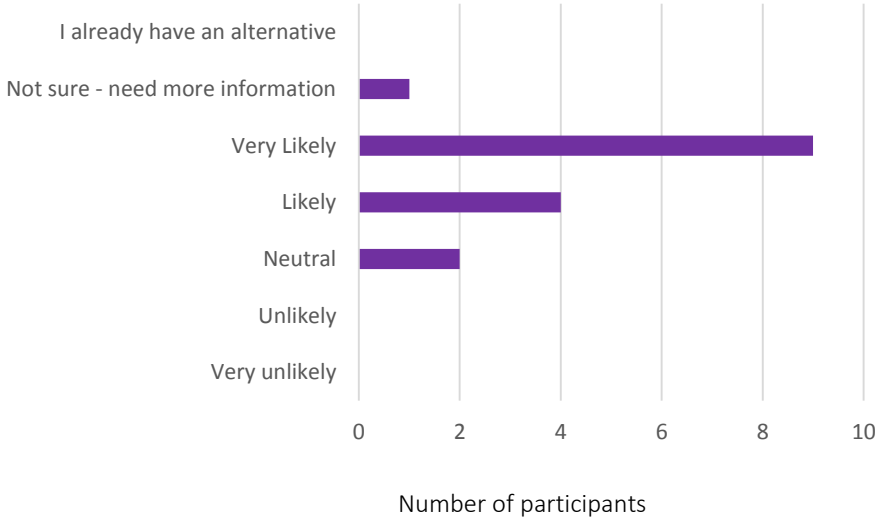
Top of the head responses – participant poll

Following the information provided and time for questions about the technologies, participants were polled about their likelihood of considering alternative heating technologies in two different scenarios, assuming all technologies cost the same. The purpose of this was to better understand participants' top of the head responses to these scenarios, and to allow for a comparison of these responses with their more informed views at the end of the project.

Replacing an existing heating system

The first poll explored how likely they would be to consider alternative low-carbon heating systems when replacing their existing heating system, assuming all the technologies cost the same. The results are presented in the following chart. Many participants were 'very likely' to consider alternative technologies.

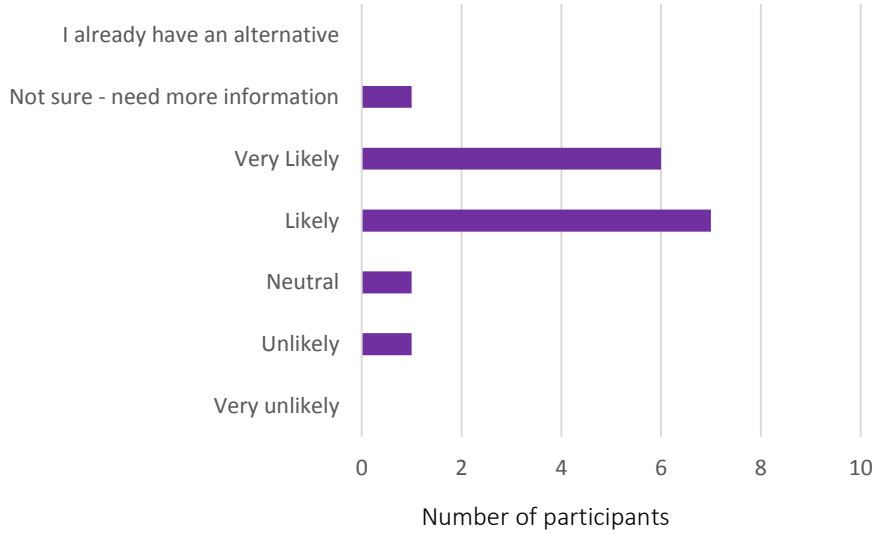
Poll 1: Please assume that all the technologies cost the same. How likely would you be to consider alternative technologies when replacing your heating system?



Moving house

The second poll explored how likely they would be to consider alternative low-carbon heating systems when moving house, assuming all the technologies cost the same. The results are presented in the chart below. Many participants were 'very likely' and 'likely' to consider alternative technologies.

Poll 2: Please assume all the technologies cost the same. How likely would you be to consider alternative technologies when moving house?



Participants' initial reactions to information about the UK's Climate Change obligations

In the second part of the information session, the Committee on Climate Change introduced the UK's climate change challenge, its objectives for reducing carbon emissions and progress to date. This information is included in section 4 of the Annex (p.49 – p.50). Participants were then asked for their initial reactions to this information. They offered the following wide range of responses:

- **Fourth carbon budget – scale of ambition:** Some participants felt that the fourth carbon budget[2] was ambitious and 'radical'. Some participants also raised concerns that the fourth carbon budget might have been set unrealistically, and raised questions about how the UK had fared to date in meeting the first three carbon budgets.

'I'm 45 and I've been learning about greenhouse gas emissions for the last 30 years….why has it taken so long (to reduce carbon emissions)?'

(Sounding Board participant)

- **Speed of action on climate change:** Some participants raised the concern that greater speed of action was necessary to address climate change, as well as the feeling that more could have been done to date on reducing carbon emissions.

'Looking at the figures (costs of heating technologies), I wouldn't be motivated to change – but the gas grid perhaps being turned off in 50 years or so does impact my thinking.'

(Sounding Board participant)

- **Personal responsibility for climate change:** Many participants acknowledged that the information provided about climate change and the impact the UK's target could have on the gas grid could influence their choice of a heating system; one participant said, '*I would like to do my personal bit to reduce my personal impact*', and another participant said that '*everyone should play their part in reducing carbon emissions*'.

'I need to understand how government would make choices easier. The ask (during the polls) to assume costs were the same isn't realistic without substantial subsidy.'

(Sounding Board participant)

- **Government responsibility and leadership on climate change**: Although many participants accepted the importance of taking personal responsibility for addressing climate change, some participants felt that more also needed to be done by government, suggesting that the government needed to offer subsidies or capital investment, rather than relying on individuals alone to choose alternative heating technologies. One participant said that '*somebody has to lead the way for others to follow'*, and suggested government had a role in providing incentives to homeowners; a thought that was echoed by other participants.

- **Collective responsibility and leadership on climate change from industry**: Some participants emphasised that it was important for industry and government to contribute towards

[2] The UK has met its targets for the first and the second Carbon budgets, which set emissions reduction targets, and is on track to meet its targets for the third Carbon budget in 2020. The fourth Carbon budget sets out an ambitious emissions reduction target for 2025.

reducing the emissions targets as well as requiring members of the public to contribute towards reducing emissions.

- **The scale of the global challenge and need for international co-operation:** Two participants noted that the challenge was global, with one participant raising the economic development of developing countries as a barrier for progress.

- **Concern about taxation**: One participant raised concerns about the likelihood of increased taxation on lifestyles as a result of these targets.

- **Innovation and supporting emerging technologies**: One participant expressed enthusiasm for low-carbon heat technologies and renewable energy on the basis of considerations other than addressing climate change, including supporting innovation, new technologies, and tackling pollution.

- **The challenge of retrofit:** One participant raised some practical concerns about how difficult it could potentially be to install newer forms of low-carbon heating in older buildings.

'They're putting the onus on us all the time to reduce and whatever, but it's at a cost to us whereas the industries don't really seem to be doing…as much as they could be doing'.

(Sounding Board participant)

'The other side of the coin is the economy side, the money side….at the end of the day it's a cost for a lot of the low income families in the country.'

(Sounding Board participant)

- **Balancing cost of the technologies with better environmental outcomes:** One participant reflected that there was a tension between the financial constraints she faced as a single unemployed parent, and the better health and environmental outcomes she wished to secure for her children.

Deliberative session scenario 1: Moving home to a low carbon district heating zone

The deliberative sessions were held the Saturday following the information sessions. In between the two sessions, participants had the opportunity to reflect on the information they had been given, as well as to ask questions and clarify any issues.

At the start of the deliberative session, participants were provided with a quick recap of the information that was covered in the information session. They were then invited to consider their responses to the following scenario. It was made clear that the scenario did not represent existing government policy.

Would you consider moving to a house in a low-carbon heating zone? What would you like to see in place to feel happy to move here?

- **You will be connected to the local heat network when your gas boiler is up for renewal.**
- **It will be installed free of charge.**
- **It is guaranteed that your heat will be cheaper than gas heating over the 20 year contract period.**

Some participants responded very positively to this scenario, with one participant describing it as an '*attractive offer – a win/win, as it's low cost'*. Others said that, with other factors such as location accounted for, they would '*in principle want to take the offer up'*.

Participants also raised a number of concerns and areas where they would seek further information and reassurance:

- **Cost:**
    - **Maintenance cost:** Many participants raised concerns about the perceived cost of maintaining the system, asking how much it might cost if there was a system failure.
    - **Long term cost:** Some participants raised a concern about the costs of the system in the long-term after the 20 year period expired; *'my concern would be what happens after the 20 years: would prices hike? Or would new terms apply?'*
    - **Savings in the long-term**: One other participant noted that she could be persuaded by a lower long-term cost, or by saving money through moving into a low-carbon heating zone. Another participant said that they would want to see statistics about when the savings from this arrangement would be realised.
    - **Tariffs**: One participant said that the pricing structure for the heating system would matter; *'how the heating is actually priced would be important for me'.*
    - **Taxation:** One participant raised a concern that an increase in tax may be used to fund this initiative; '*I would take this on thinking that I would save money, but if it turns out I was actually dishing out more in terms of taxes, that would make me sceptical'.*

- **Reliability:**
    - **Maintenance:** Many participants raised maintenance as a potential issue; including perceived hassle associated with maintenance. One participant said that a particular concern for them would be ensuring they could trust heating providers and maintenance staff to provide a good and reliable service.
    - **Connections across a heat network**: Some participants raised concern about the interdependence of heating systems across a network, and whether the houses connected would be affected if a main source malfunctions.
    - **Back-up systems:** Some participants wanted assurance of the system's reliability through the availability of back-up systems in place in the event of malfunction.

- **Flexibility of the system:**
    - **Household circumstances:** Some participants noted the need for any heating system to fit with their particular individual and family circumstances regarding rooms they wished to heat.
    - **Control:** One participant felt it was important that the system allowed residents to control the levels of heating available within the residence; for them the *'important thing would be individual control'.*

- **Other relevant considerations:**
    - **User-friendly:** Some participants highlighted the importance of ease of use of the system, and whether they would be able to explain to prospective buyers of their home how the heating system worked.

- **Location:** Some participants were concerned that the offer may not be available to them within the locality or area where they lived, or within a distance which would allow them to commute to and from work.
- **Managing disruption:** One participant emphasised that minimising disruption to the house would be important to them; '*I wouldn't want the whole house to need to be renovated.'*
- **Impact on the neighbourhood and locality:** Some participants also queried whether maintaining a shared system may have other unintended impacts or cause other forms of disruption for the local area, for instance; '*if the roads are being dug up all the time to fix pipes, that wouldn't be a good thing'*.

Deliberative session scenario 2: Replacing an existing heating system with a heat pump

Participants were then introduced to a second scenario and invited to consider their responses. It was made clear that the scenario did not represent existing government policy.

Renewing your existing heating system

- There is no local heat network to connect to.
- You can choose any other heating technology you like.
- Incentives are in place to make all technologies cost about the same.

What would need to be in place for you to choose a heat pump?

Many participants felt that they needed more information about the practical and operational requirements of a heat pump, and some participants indicated that they would be likely to undertake more research about heat pumps.

'I'd need more information. I'm feeling the fear of the unknown somewhat and need more knowledge on how it works and what it would be like to actually have the system.'

(Sounding Board participant)

Participants also identified the following issues:

- **Installation:** Many participants raised concern about the potential disruption within the home that installation of a heat pump may cause. These included the scale of changes they may need to make, such as installing radiators and insulation. One participant noted that more than one person lived in their household, and that she would want to understand better the potential disruption it could cause to her family's lifestyle. Another participant asked a question about the timescale for installation, suggesting that if installation took weeks or months it would be a barrier. It was clarified at this point by the Committee on Climate Change that installation for air source heat pumps was usually a matter of days rather than of weeks. There were also more questions about the practicalities of installing heat pumps, including:
    - Questions about the **size of the area** that ground source heat pump pipe networks would need to cover
    - Questions about the **potential disruption from drilling boreholes into the ground** for ground source heat pumps and the **impact that could have on neighbourhoods and communities**
    - Questions about whether, in some instances, **planning permission** may be required for the installation of ground source heat pumps.

- Questions about whether **a single air-source heat pump could supply more than one home within a block of flats** (it was clarified that they could, at which point it would be communal heating, or part of a heat network).

It was noted by the Committee on Climate Change that there are some limitations on installing ground source heat pumps as a stretch of land would need to be dug up. However, there was also the possibility of the government installing boreholes for connection where appropriate.

- **Noise pollution :** Some participants raised concern about the potential for noise pollution and wanted more information about the likely effect of noise pollution on residents; *'External noise was mentioned – I would like to know how much this would affect my neighbours, and if they would be likely to complain?'* One participant asked about the impact of '*cumulative noise pollution'* in the event that a block of flats or an entire city was running on heat pumps. There were also questions about the effect noise might have on residents' quality of life, and whether it may cause some disturbance within the home.

'Walking down the street and hearing the hum of all these reverse refrigerators might be quite upsetting!'

(Sounding Board participant)

It was clarified by the Committee on Climate Change that whilst there was some noise from air-source heat pumps, ground source heat pumps did not have the same issue.

- **Suitability of the building:** Some participants observed that it would be easier to install low-carbon heat technologies into new-build homes which may be better adapted with radiators, underfloor heating and insulation; *'The fact that you have to have bigger radiators and insulation makes me feel this is better for new-builds'.*

There was some concern that older properties and participants' existing properties may not be best placed to benefit from the installation of the heat pumps due to poor insulation, or the need to make other adjustments including installing underfloor heating or installing larger radiators. It was clarified by the Committee on Climate Change that increasingly, more properties are able to benefit, with new properties in London being connected to a heat network and housing associations encouraging the uptake of such technologies.

One participant thought that developers should be asked or required to install new heating technologies. The Committee on Climate Change explained that the government had identified that requiring this of new developments could pose an additional barrier to building new homes in the context of the short supply of housing in some areas. It was suggested by the participant that this was a short-sighted approach.

'That's just a really short-sighted approach'.

(Sounding Board participant)

- **Reliability of the technology and maintenance:** Some participants felt that they needed more information about how reliable and effective the technology was. One participant suggested that a long-term guarantee for parts and labour as well as a maintenance agreement about the long-term cost of maintaining the technology would address some of these concerns.

- **Ease of use and ease of maintenance:** Some participants felt that it was important to have access to more information about how easy the technology would be to use; in particular, whether it would be possible for residents to take simple steps to fix basic issues that arose with the technology, and whether the technology was likely to be user-friendly and easy to control. Some participants were also clear that they felt they needed more information to be in a position to judge whether it would be suitable for their own circumstances and needs.

- **Benefits of the technology:** Some participants noted that improved insulation, the installation of underfloor heating and the installation of radiators would have a positive double-effect on the quality of heating in their own homes. One participant observed that if '*all the technologies are going to help me cut energy bills, it would be whatever has the lowest carbon emissions*' that would guide their decision-making, explicitly referring to the environmental benefits of the technology. Another participant noted the benefits in terms of improved energy efficiency through the use of less electricity, as well as the potential for delivering longer-term cost savings.

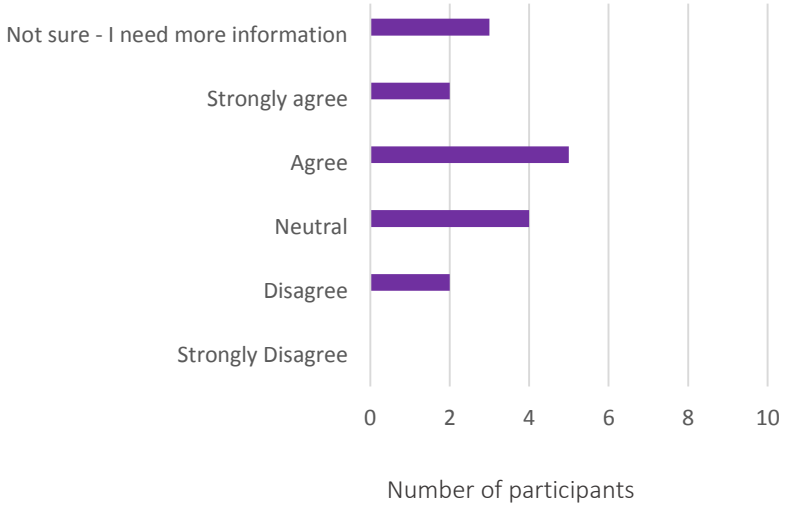
- **Home and contents insurance:** One participant queried whether there would be any impact on either home or contents insurance, and whether there would be any additional insurance cost associated with installing the technology.

Choice vs cost participant poll and discussion

In the next section of the deliberative session, participants were asked whether they would be prepared to accept for their choice of heating technology to be limited in exchange for a long-term reduction in their heating bills of around 10-15% through a poll. It was made clear that this scenario did not represent existing government policy. The results are presented on the following chart.

Poll 3: Because different technologies are suited to different locations, it may be possible to lower heating bills by opting for a given solution for a particular area (i.e. heat networks or heat pumps).

Would you be prepared to accept your choice of technology being limited in exchange for a long-term reduction in your heating bills (e.g. 10-15%)?



Whilst some participants agreed that they would be prepared to accept their choice of technology as limited in exchange for a long-term reduction in their heating bills of 10%-15%, others disagreed, were neutral about the option, or felt that they needed more information. Those participants who supported the idea of a limited choice in exchange for reduced bills were attracted by:

- The guarantee of **cheaper bills**: *'I think that if everybody in the area has the same and it makes it cheaper, it's better for everybody. As long as it's got heating I don't take much notice of how it's heating'.*

- A **whole community having the same system**, making maintenance and support easier; *'if anything goes wrong you can ask someone else and deal with any problems as a community.'*

- The idea of being **environmentally friendly**: *'the offer of being green and also low cost is quite attractive to me. The economics make sense to me.'*

- The potential for **locally tailored heating solutions**: *'it would depend on what solutions would be offered to the area. If they're tailored to the area, then I think I would strongly agree.'*

One participant reflected that it would remain their choice about whether to move into that local area, and confirmed that an incentive for them to do so would be a reduction in heating bills.

However, just over half of the respondents either sought more information about, were neutral about, or disagreed that they would be prepared to accept limitations on their choice of technology in exchange for reduced cost. They raised the following concerns:

- **Personal freedom and choice:** Two participants objected to the idea of having their choices limited. These participants cited the importance of protecting personal freedom of choice, with one participant saying that he *'disagreed in principle with having a restriction on choice imposed*', and another person expressing concern about forcing a change on individuals who might already be living in an area.

  It was explained by the Committee on Climate Change that there may be economic reasons for limiting choice within a particular area – with lower risk accruing to a company where there is a large customer base, and therefore a lower cost for that company. It was also clarified that this poll did not reflect government policy.

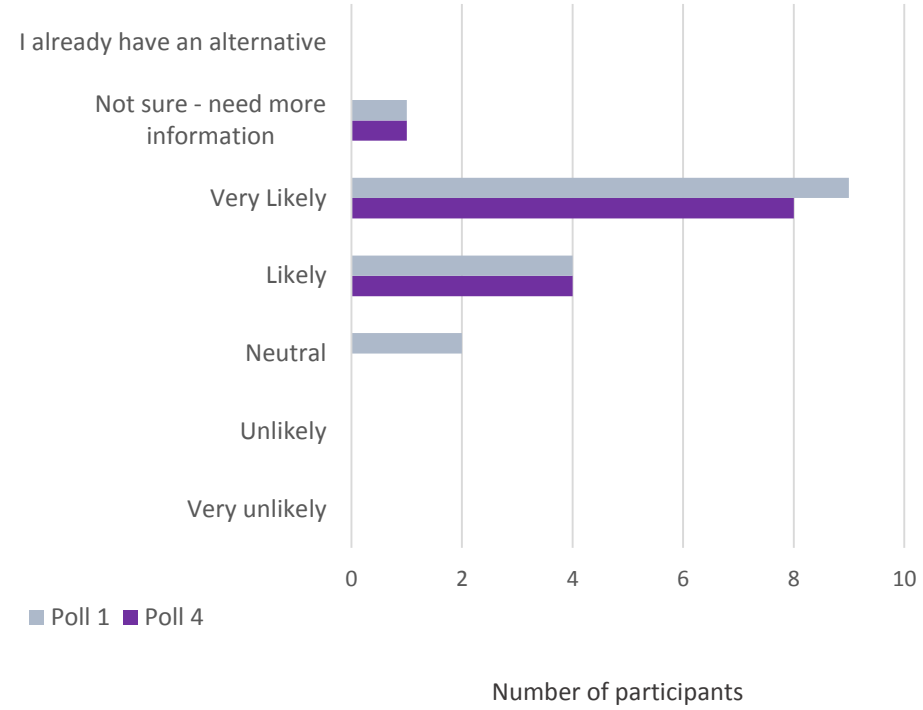
- **10-15% decrease in cost inadequate compensation for constraint on choice:** Two participants suggested that they felt 10-15% lower cost was inadequate compensation for a limitation on their choice of heating technology. One participant suggested that they could secure a 10-15% decrease in cost by '*shopping around*' for providers already, and another participant said that *'10-15% isn't really that significant in the scheme of things, so wouldn't make a difference one way or another'.*

Results from three participant polls

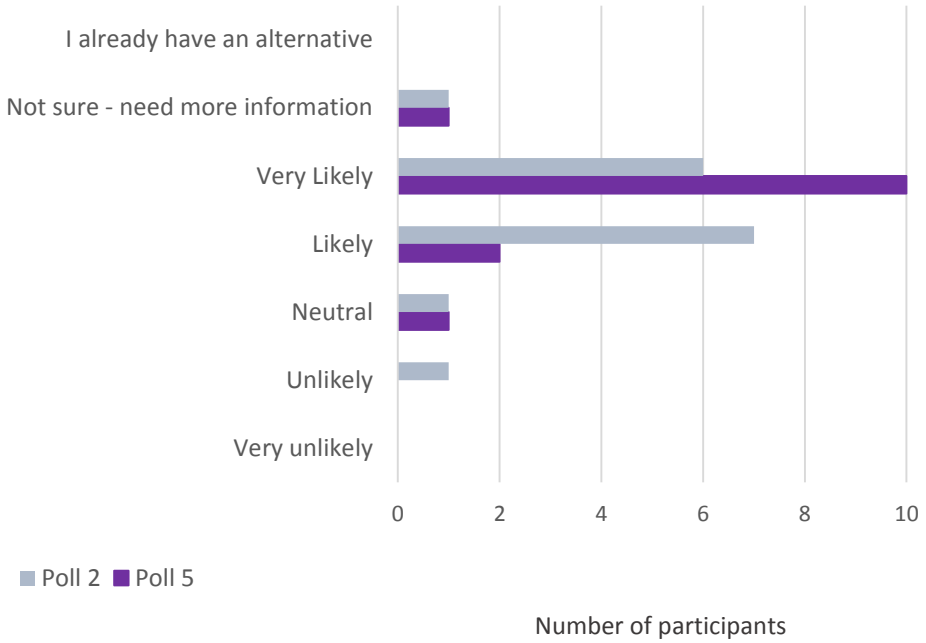
Towards the end of the deliberative session, Sciencewise re-ran the initial polling questions that had been asked at the beginning of the Sounding Board sessions, to allow for a comparison of views.

Participants' initial responses are labelled as Poll 1 and Poll 2, and participants' responses to the re-run of these questions are labelled Poll 4 and Poll 5. The results are presented in the following charts.

Poll 1 & Poll 4: Please assume that all the technologies cost the same. How likely would you be to consider alternative technologies when replacing your heating system?



Poll 2 & 5: Please assume that all the technologies cost the same. How likely would you be to consider alternative technologies when moving house?



It is clear from comparing the results of Poll 4 with the results of Poll 1 that few participants had changed their views about considering alternative heating technologies when *replacing their heating*

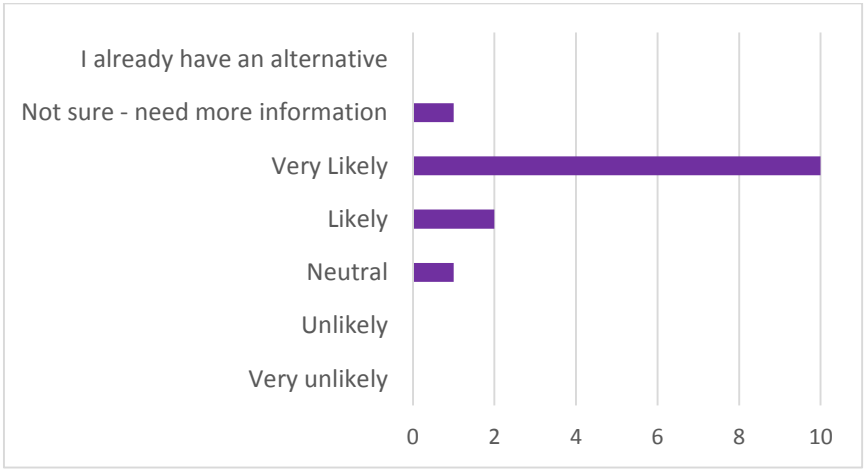
system after being given more information and the opportunity to discuss the issues. Many participants said that they would be 'very likely' to consider alternative heating technologies in this case.

Comparing the results of Poll 5 and Poll 2, more respondents said that they would be 'very likely' to consider alternative technologies when *moving house*. Learning more about these issues had increased their openness to new low-carbon heat technologies in this circumstance.

The 'Hassle Factor' poll

Participants were also asked to complete a final poll about their attitudes to alternative heating technologies in circumstances where all barriers preventing the uptake of low carbon heat technologies were addressed. The results are presented in the following chart.

Poll 6: Assume any barriers were dealt with so you felt the technologies were worth roughly the same (allowing for hassle, maintenance and so on). How likely would you be to consider alternative technologies?



Again, many participants said that they would be 'very likely' to consider alternative low-carbon heat technologies if they felt the technologies were worth roughly the same, allowing for other factors such as hassle and required maintenance.

Reflections after the polling

After completing these polls, participants were invited to explain their answers. It was clear from this discussion that few participants had experienced a significant change of view as a result of deliberation. Some participants reported that they felt they had more information, views and perspectives to consider in light of the discussion, and that as a result, the conversation had 'opened their eyes'. Other participants noted that they needed to find out more information about the technologies to come to a conclusion on whether they would be likely to want to install them.

'It's opened my eyes – it's a decision we're going to have to face very soon. Our system is very old and very inefficient, so as a result I am maybe now more likely to consider change.'

(Sounding Board participant)

The role of government: Supporting the public to reduce carbon emissions

At the end of the deliberative session participants were asked about the role of government in supporting members of the public to reduce carbon emissions from heating. A range of themes emerged, with many participants emphasising the importance of education, information and independent advice. Some participants felt that incentives and subsidies from the government were important, as well as government demonstrating leadership on the low carbon agenda through setting an example for others to follow. Others also thought that there was a clear role for government in supporting the public to have confidence in providers of low-carbon heat technologies through accreditation schemes and quality assurance. One participant asked whether the government could require heat pumps for installation in new build homes[3], and another participant said that they thought the government should introduce a carbon taxation scheme.

'Can governments insist on installing heat pumps in new buildings?'

(Sounding Board participant)

Participants raised the following issues as part of this discussion:

- **Education, information and independent advice:** Many participants highlighted the importance of providing education, information and independent advice on the technologies. Participants felt that the government should inform the public about the availability and practicalities of the technologies by ensuring that the relevant information is publicly available. Some participants said that it would be helpful to have information about the advantages and disadvantages of different technologies, and one participant felt that access to experts and case studies would be especially helpful.

'The government should not only provide incentives, but should also provide more information to help people to make choices.'

(Sounding Board participant)

- **Transparency in decision making:** Some participants felt it was important that government is clear and transparent about how policy decisions in this area are made – especially where they were likely to affect different parts of society adversely. One participant in particular felt it was important that government was transparent about how successful moving to low-carbon heat technologies has been to date, providing information and statistics about levels of success elsewhere.

- **Incentives, investment and subsidies:** Some participants felt that there was a role for government investment in infrastructure and a role for government in terms of providing incentives and subsidies to encourage uptake of low-carbon heat technologies. '*Incentives are everything – if the market can't make them (technologies) low cost the government should step in and make them either parity or even a lower cost'.*

- **Government should lead by example:** Some participants felt that the government should lead by example by ensuring all government buildings use low-carbon heat technologies.

[3] This discussion took place during the Information Session, but we include it within this section because of its relevance to the question posed during the Deliberative Session.

Other participants felt that businesses should similarly set an example for the public to follow; *'government should lead the way, along with corporations and businesses.'*

Some participants also expressed concern that government action in areas of energy policy was not convincing (through, for example, the reduction of feed in tariffs and the Green Deal) and felt that there was a need to show commitment to the low carbon agenda.

- **Quality assurance and accreditation:** Some participants also thought there was a role for the government in supporting quality assurance and accreditation of private contractors and suppliers of low-carbon heat technologies, echoing concerns heard earlier in the deliberative conversation about access to fairly priced, quality and readily available maintenance and repair arrangements. '*Accreditation of private contractors would be a very useful check on what they are offering – so you know that they know what they are talking about.'*

'The discussions have made me realise, through hearing other people's views, that there are a lot of different perspectives on this, and that the devil is in the detail.'

(Sounding Board participant)

- **Carbon tax:** One participant thought that the government could monitor carbon footprints as well as applying taxation rates to an individual's carbon footprint. It was suggested that this could involve the government applying a 'carrot and stick approach' alongside incentives.

Further reflections from participants

At the end of the session, participants were asked if they had any final thoughts to share with policymakers. Many participants said that they valued learning about the new technologies and felt more informed as a result of the process. While some participants felt more positive about the potential for new technologies as a result of the discussions, others reflected that learning more about the technologies had raised other questions which they felt needed to be addressed. A number of participants expressed a keen interest in being kept up to date with the development of the project and policy area, as well as in understanding better the work of the Committee on Climate Change.

'I now realise the disruption is minimal, compared to what we are looking at on a global scale.'

(Sounding Board participant)

Follow-up thoughts from participants

After the Sounding Board sessions, participants were asked to complete a survey about their experience. This included a question about solutions to barriers to uptake of low-carbon heat technologies and the opportunity to share any further thoughts with the Committee on Climate Change. Thirteen out of the seventeen participants responded to this survey. The results are summarised in the following section.

Participant ideas: Solutions to barriers for uptake of low-carbon heat technologies

Participants were asked the following question in the follow-up survey:

> **Policymakers are interested in your ideas for solutions that will overcome the barriers (apart from cost) to people installing low-carbon heat technologies in their own homes. Barriers might include worries about quality and reliability, space needed, visual impact or just too much trouble. Please tell us your ideas for overcoming such barriers.**

Respondents provided a wide range of responses to this question, some of which had already been raised during the course of the Sounding Board sessions. The barriers respondents identified included lack of information and awareness, concerns about maintenance, quality and reliability, as well as the hassle and potential disruption to their lifestyle. Participants' suggested solutions included the following:

- **Independent information and advice:** Many respondents felt that provision of reliable and independent information to the public which is trusted, accessible and user-friendly would be useful. They felt this should cover:
  - How the technologies are used, installed and will benefit the environment as well as financial cost-benefit analysis
  - Testimonials from users about their personal experiences of using and installing a low-carbon heat technology
  - Information on the pay-back periods and life-cycle of the equipment
  - Information about the upheaval and level of change required to fit a system.

  A number of respondents also thought that the information should be widely accessible. Examples cited included information printed on leaflets and available at estate agents, libraries, schools, health bodies, and local authorities; as well as information provided online.

- **Government schemes, subsidies and incentives:** Some respondents suggested that a government scheme that provided incentives and subsidies through grants or loans would address some of the non-financial barriers to uptake of low-carbon heat technologies. One in particular noted that reassurance of the government's long term commitment would be necessary for uptake of the technologies.

- **Long-term guarantee scheme:** Many respondents highlighted the importance of a long-term guarantee and/or compensation scheme in place, as well as the availability of both breakdown repair support and accessibility of regular maintenance.

- **Accreditation for installation:** Some respondents raised the importance of accredited installers, and suggested a certification scheme for low-carbon heat technologies.

- **Awareness-raising campaign:** One respondent suggested a communication and awareness raising campaign that might make '*carbon hungry technologies'* less socially acceptable, alongside improved information about the availability of low-carbon heat technologies.

- **Practical assistance:** One respondent also suggested the availability of practical assistance through government, for instance, in providing loft clearing services, trench digging and suitable sites for the equipment necessary for installation.

- **Independent studies and research:** One respondent also suggested the value of continuing to support independent studies and research into low-carbon heat technologies; '*the more independent studies carried out, and knowledge available, the better.'*

Final thoughts from participants

Participants were asked in the survey whether, having participated in the sessions, they had any further thoughts on the issues discussed. Participants emphasised:

- The importance of a **clear plan for UK installations** (including the need for a five year plan, as well as outlining milestones and steps).
- The importance of **large businesses leading the way.**
- The importance of **effective and clear consultation** with members of the public.
- The **contribution independent experts** could make in supporting uptake.
- Ensuring that the **impact on the environment** was communicated effectively.
- Recognising that the offer of a **technology being both green and inexpensive** could potentially be very attractive to a large number of people.
- The importance of **financial incentives** to behaviour change and uptake of low-carbon heat technology.

Some participants also indicated that they valued learning about the technologies, and that they enjoyed participating in the process.

Conclusion

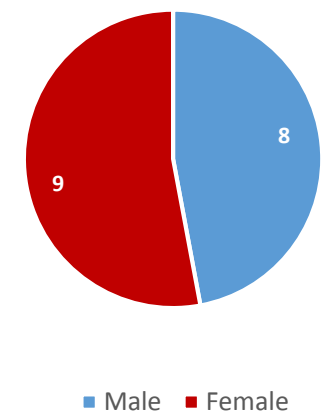
Participants demonstrated, through both polling and discussion, that they were generally open to considering alternative low-carbon heat technologies when asked to assume that cost was not an issue. They explored a breadth of issues, identifying concern about hidden costs, the reliability of the technologies, whether the systems would be sufficiently flexible and easy to use, and the impact of disruption and noise pollution on both themselves and the wider community. Some participants also identified barriers associated with retrofitting existing or older homes.

Participants were divided over whether they would be prepared to accept for their choice of heating technology to be limited in exchange for a long-term reduction in their heating bills. Many participants identified benefits of constrained choice, including reduced costs, ease of support for maintenance issues and environmental benefits. However, some participants expressed their discomfort at having their choice constrained as a matter of principle.

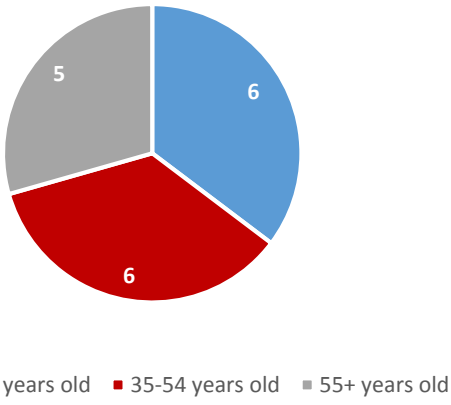
Many participants indicated that there was a strong role for government in providing independent and accessible advice and information about the technologies, accreditation and quality assurance schemes, as well as in providing financial incentives and other services to support uptake of these technologies. Many participants also felt that it was necessary for both government and businesses to demonstrate that they were leading the way in using and installing the technologies.

Annex: Who participated in the Sounding Board?

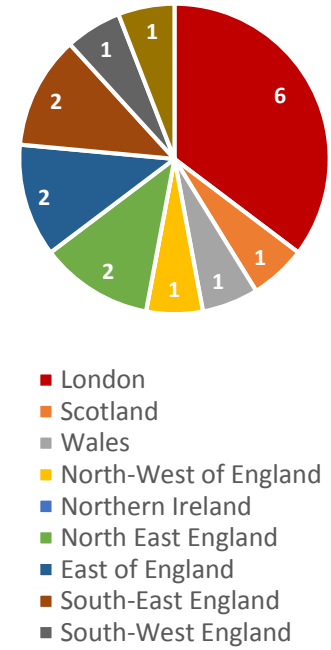
Gender of Participants



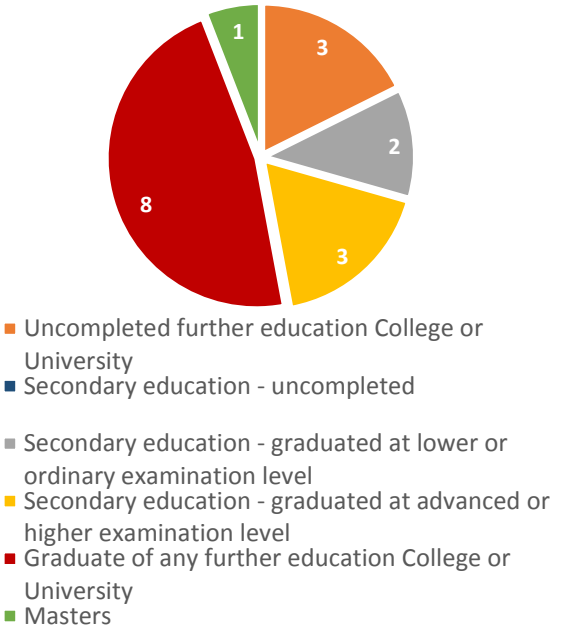
Age of Participants



Geographical Location



Educational Background



Section 2: Participants' Experience

The feedback provided after the sessions suggested that participants had a positive experience taking part in the Sounding Board:

- **Was the purpose understood?**
  12 out of 14 respondents said they 'strongly agreed' that they understood clearly the purpose of the Sounding Board project. One respondent 'tended to disagree', and one respondent 'tended to agree'.
- **Did the information seem fair and balanced?**
  6 out of 14 of respondents said they 'strongly agreed' and 7 out of 14 of respondents said they 'tend to agree' that the information provided seemed fair and balanced.
- **Was facilitation fair and unbiased?**
  9 out of 14 said they 'strongly agreed' and 4 out of 14 respondents said they 'tend to agree' that the way the sessions were facilitated was fair and not biased.
- **Were participants able to contribute their view and have a say?**
  10 out of 14 said they 'strongly agreed' and 4 out of 14 of respondents said they 'tend to agree' that they felt able to contribute their view and have their say.
- **Did participants learn something new as a result of taking part?**
  9 out of 14 respondents said they 'strongly agreed' and 5 out of 14 respondents said they 'tend to agree' that they learned something new as a result of taking part.
- **Did taking part affect participant views on the topic?**
  6 out of 14 said they 'strongly agreed' and 6 out of 14 said they 'tend to agree' that taking part affected their views on this topic.
- **How satisfied were participants with the sessions they took part in?**
  12 out of 14 said they 'strongly agreed' and 1 out of 14 said they 'tend to agree' that overall they were satisfied with the Sounding Board sessions they took part in.

Section 3: Facilitation Plan

Committee on Climate Change Sounding Board - Facilitation Plan

Session 1 & 2: Introduction Session

45-60 minutes

7pm, Wednesday 3rd February; and Thursday 4th February

This introductory session will be held twice, each to be attended by 8-10 members of the public who will participate in the Sounding Board, including 3 participants/observers from the Committee on Climate Change, and 3 participants from Sciencewise – one facilitator and two members of the team for tech/facilitation support.

The focus is on a) getting everyone logged into the call and familiar with the technology and b) sharing information about the policy issue.

In advance, participants will be emailed a sheet of instructions for logging on to the call (with hard copies posted to those who have indicated a preference for this). They will also be emailed/posted a two-pager on the substance of the policy issue to be discussed.

Participants will be asked about their existing heating arrangements prior to the session.

Timing	Objective	Notes	Duration
From 15 mins before session formally starts. **Slide 1**	**Log on / arrivals** Participants are successfully logged on the call.	Everyone gets logged on. Facilitators and tech support are available to help with trouble-shooting. Viewing panels are in presentation mode.	15 mins
Slide 1	Participants are successfully logged on the call and familiar with key aspects of the technology.	Get everyone logged on. The first slide that appears on the screen gives instructions on what participants have to do. Using the Q and A box for tech support. Trouble-shooting.	10mins
Slide 2, 3, 4		Background to the sessions and how they will work: • first session is for information giving (around 10 people). • second session for discussion (in same groups) Looks more complicated than it is - we'll introduce you to the key	5 mins

		tech features when it's time to use them. Ground rules. To avoid all talking at once, please use the raise your hand button.	
Slide 5	Open Question to participants.	*"When it comes to replacing your heating system (or choosing a new heating system) what sort of things do you consider in the decision?"*	5 min
Slides 6, 7, 8, 9, 10	Participants are informed about the CCC and understand what the topic is all about. The alternative technologies are then described: *Walk-through of a slide comparing gas boilers with different alternatives. This will be high level information on capital costs, running costs etc. Alongside photographs of the options.*	**Facilitator hands over to CCC policymaker** A presentation on why we are being brought together; the background, and the substance of the policy issue being discussed. A speaker from CCC to lead content elements of presentation	5 mins
Slide 11	Participants can clarify key aspects of the policy issue.	**Q and A** Participants raise their hands to send in questions.	10 mins
Slide 12	*TWO POLLS* *Poll 1:* *Please assume that all the technologies cost roughly the same. How likely would you be to consider alternative technologies when replacing your heating system?* *1) Very unlikely* *2) Unlikely* *3) Not sure – need more information* *4) Likely* *5) Very likely* *6) I already have an alternative (if so: please specify which this is in the text box in the bottom right hand corner)*	**Poll** A benchmarking poll to understand first impressions, coordinated and introduced by facilitator.	3 mins
	Poll 2:	**Poll**	3 mins

Slide 12	*Please assume that all the technologies cost roughly the same. How likely would you be to consider alternative technologies when moving house?* *7) Very unlikely* *8) Unlikely* *9) Not sure – need more information* *10) Likely* *11) Very likely* *12) I already have an alternative (if so: please specify which this is in the text box in the bottom right hand corner)*	A benchmarking poll to understand first impressions, coordinated and introduced by facilitator.	
Slides 13, 14, 15	Participants explore how low-carbon heating relates to wider climate change challenges. Policymakers to introduce and explain the need to move away from gas grid in order to meet targets.	CCC speaker presents information about climate change as well as the pathway needed to reach 2050 target and the implications on gas heating.	5 mins
Slide 16	*Discussion 1: What are your initial reactions to this information?*	Facilitated roundtable discussion of people's reactions to information about climate change challenges and shifting towards low carbon technologies.	10 mins
Slide 17	The barriers *Existing research about non-financial barriers to decarbonising heat*	CCC speaker presents briefly on the non-financial barriers that have come up from previous research	3 mins
Slide 18	Existing solutions to the barriers	CCC speaker presents briefly on some of the existing solutions to barriers	5 mins
Slide 19 and 20	Participants understand what happens next.	**Scene setting** for next session. Tell participants that we will be looking at solutions to non-financial barriers and to come with any ideas/suggestions they have on this. Ask participants to reflect on previous experiences they've had with heating/cooling (e.g. camping, trains, planes, hotels etc.) and on what changes there have already been in this area. Clarify Next Steps (second slide)	5 min

This session is recorded.

We make a note of any participants who had technical problems and weren't able to get on to the call. We will work with them 1:1 between the Wed/Thursday and the Saturday to resolve these problems.

Session 2: Substantive, deliberative session
90 minutes, on Saturday 6th February

This is the main opportunity for gathering public views and for deliberation. Again these will be run with 8-10 participants in each and will happen twice on the same day (for example at 11:00 - 12:30, 13:30 - 15:00) – to be confirmed.

We will send invitations specifying an arrival period before the substantive meeting begins (eg. "please come onto the call from 10:40 for a 11:00 start")

We will have a slide-deck queued up with all the slides from each part of the presentation integrated. The first slide has instructions for participants for them as they get onto the call.

Timing	Objective	Notes	Duration
From 20 mins before session formally starts.	**Log on / arrivals** **Participants are successfully logged on the call.**	**Everyone gets logged on.** **Facilitators and tech support are available to help with troubleshooting.** **Viewing panels in presentation mode.**	**15 mins**
Sessions starts	**Icebreaker** Everyone knows who is on the call and is comfortable talking to each other	An icebreaker to get everyone introduced, and also taking the opportunity to practice using some of the technical features of the webinar (eg. raising hands, using chat etc). Led by facilitator. Viewing panels in discussion mode.	**5 mins**
	Recap Participants remember where we have got so far.	**Policy analyst from CCC to recap the key issues:** - The move away from gas and the barriers (with a single summary slide). - Existing government solutions - Existing heat technologies Viewing panels in presentation mode.	**10 mins**
	Section 1: Scenarios and roundtable discussions	Short introduction from CCC Policy Expert, to Scenario 1 e.g. Moving house to a low-carbon heat zone Viewing panels in presentation mode. *"We are now going to take you through a hypothetical scenario.*	<5 mins

		This does not represent current Government policy. *Please picture the following scenario. You or a member of your family is looking to move homes. The home under consideration is in a newly designated 'low-carbon heat zone.' The agent explains that this means the property will need to connect to the local low-carbon heat network when the gas boiler is up for renewal, within a period of 10 years. The heat network operator is in charge of connecting properties, and will install the heat interface unit in your home free of charge, and provide a guarantee that the heat will be cheaper than gas heating over the period of the contract (20 years)."*	
	Scenario 1 roundtable	**Question:** What would you want to see put in place in order to be confident in moving into the area?	10 mins
	Scenario 2	*"Now imagine that this time you need to renew your current heating system. There is no local heat network to connect to. Incentives are in place to make the costs of the technologies broadly the same."* **Question.** Under what circumstances would you choose to switch to a heat pump? Viewing panels in presentation mode.	<5 mins
	Scenario 2 roundtable. Discuss with participants their suggested solutions to non-financial barriers.	Barriers and solutions slide is up on the screen for this discussion. Facilitator to take participants through a discussion around the potential solutions needed for participants to be happy choosing a heat pump. And any other solutions to the different barriers they can think of. Viewing panels in discussion mode.	10 mins

	Choice v Cost Scenario opinion poll.	Because different technologies are suited to different locations, it may be possible to lower heating bills by opting for a given solution for a particular area (i.e. heat networks or heat pumps). Would you be prepared to accept your choice of technology being limited in exchange for a long-term reduction in your heating bills (e.g. 10-15%) 1) Strongly disagree 2) Disagree 3) Not sure – I need more information 4) Agree 5) Strongly agree	5 min
	Discussion around polling	Why did people respond how they did? What reassurances would you need in this situation (in order to swap to an alternative technology)? (e.g. • someone else responsible for maintenance? • the option to switch back to gas if a certain performance standard is not met?)	10 mins
	Post-deliberation poll We have indication of the participants' responses to the main overarching issue, after deliberation.	*Poll:* *Provided that the costs are dealt with so all the technologies now cost roughly the same. How likely would you be to consider alternative technologies when replacing your heating system?* *13) Very unlikely* *14) Unlikely* *15) Not sure – need more information* *16) Likely* *17) Very likely* *18) I already have an alternative (if so: please specify which this is in the text box in the bottom right hand corner)*	2 mins

	2nd polling Question	*Poll:* *Provided that the costs are dealt with so all the technologies now cost roughly the same. How likely would you be to consider alternative technologies when moving house?* *19) Very unlikely* *20) Unlikely* *21) Not sure – need more information* *22) Likely* *23) Very likely* *24) I already have an alternative (if so: please specify which this is in the text box in the bottom right hand corner)*	2 mins
	3rd polling Question The description of 'worth roughly the same' may need to be explained slightly more by the facilitator.	*Poll:* *Provided the problems were dealt with so you felt the technologies were **worth** roughly the same (including any hassle, maintenance etc.) How likely would you be to consider alternative technologies?* *25) Very unlikely* *26) Unlikely* *27) Not sure – need more information* *28) Likely* *29) Very likely* *30) I already have an alternative (if so: please specify which this is in the text box in the bottom right hand corner)*	2 mins
	Reflection on polls So that we understand what, if anything, changed participants minds; and what might change their minds in the future.	Facilitated discussion of any differences between responses to the pre-deliberation and post-deliberation poll question; and what issues participants would need to see resolved in order to explore alternative forms of heating. Viewing panels in discussion mode.	10 mins
	Role of the Government Group discussion on the role of the government in supporting uptake of low-carbon heating	Facilitated discussion	10 min

	Closing Participants feel valued for their contributions and understand what is happening next.	Thank the participants and summarise what we've learnt from their contributions. Flag that they will be receiving evaluation forms. Say that they'll need to hand these back to trigger payment of the £60. Outline next steps in the process.	3 mins

Worst case scenario: If there are severe technical problems and it isn't possible to have a meaningful discussion on the call, then we will circulate an email survey to all the participants and then pick a small sample of (say) 7 to do individual interviews by phone.

Section 4: Participant Briefing

Sciencewise and Committee on Climate Change (CCC) Participant Information Pack

Low-Carbon Heat Technologies

Introduction

The Committee on Climate Change (CCC) is an independent statutory body advising the UK government and devolved administrations on climate emissions targets.

They are seeking your views about low-carbon heat technologies and their contribution towards reducing carbon emissions. As part of this, the CCC are also seeking informed participants' views about what is preventing the uptake of low-carbon heat technologies, as well as what could be done to increase the uptake.

Sounding Board: We want to hear your views about low-carbon heat technologies

The Sciencewise Sounding Board session is a chance for you to help us think about low-carbon heat technologies as well as how they relate to climate change. The Sounding Board is an online webinar platform through which policymakers can have conversations with members of the public.

We are convening a Sounding Board for two sessions – one is an introduction session to familiarise participants with the technology and policy issue, and the other is a discussion session for participants to enter into a conversation about possible solutions.

The introductory session is on **Thursday 4th February at 6.45pm for a 7.00pm start (finish 8.00pm)**.

The discussion session is on **Saturday 6th February at 12.45pm for a 1.00pm start (finish 2.30pm).**

Members of the Committee on Climate Change secretariat will contribute to the sessions and will be available to answer questions during the session.

Background information

During these sessions, we will cover:

- An **introduction to the technology** and how to use it, as well as housekeeping
- A short **information session** about:
    - the UK's carbon emission targets
    - a comparison of the different low-carbon heating technologies
    - existing research about identified barriers to adopting low-carbon heating technologies
    - existing solutions that have been explored
- We will also **facilitate a conversation** with participants about what they think some of the other solutions to these barriers may be.

Background material for advance reading

i) How do we heat our homes?
ii) The causes of climate change

iii) Evidence of climate change
iv) The impact of climate change
v) The UK's emissions reductions target
vi) Where do carbon emissions in the UK come from? How can you reduce them?
vii) About the Committee on Climate Change (CCC) and Sciencewise

i) How do we heat our homes?

We are going to be focusing on emissions from how we heat our homes in the two sessions.

Most homes in the UK (around 80%) have gas boilers. Around 3 million homes are on electric heating and a million have either oil or Liquid Petroleum Gas boilers.

Heating efficiency can be improved by greater insulation, and more efficient boilers.

In the longer term, we will also need to switch away to low-carbon types of heating, which can either run on low-carbon electricity or which use renewable fuels such as wood. Linking up homes to networks of hot water pipes means that you can connect up properties to other low-carbon sources such as waste heat from power plants or geothermal heat.

ii) The causes of climate change

"Climate" means the long-term behavior of the weather or, more generally, the natural environment (including the oceans, land, snow and ice). Several factors play a role in Earth's climate:

- The main source of Earth's heat is the Sun, so changes in solar output affect our climate. Low solar activity may well have caused a series of very cold European winters during the 1700s. Longer-term shifts in our orbit around the Sun have caused the Earth to go in and out of "Ice Ages" over hundreds of thousands of years.

- Volcanoes, such as Pinatubo in 1991, can throw large amounts of dust into the atmosphere. This can cool the climate for a few years.

- Carbon dioxide (CO_2) and other gases in the atmosphere help to warm the Earth. This is called the greenhouse effect.

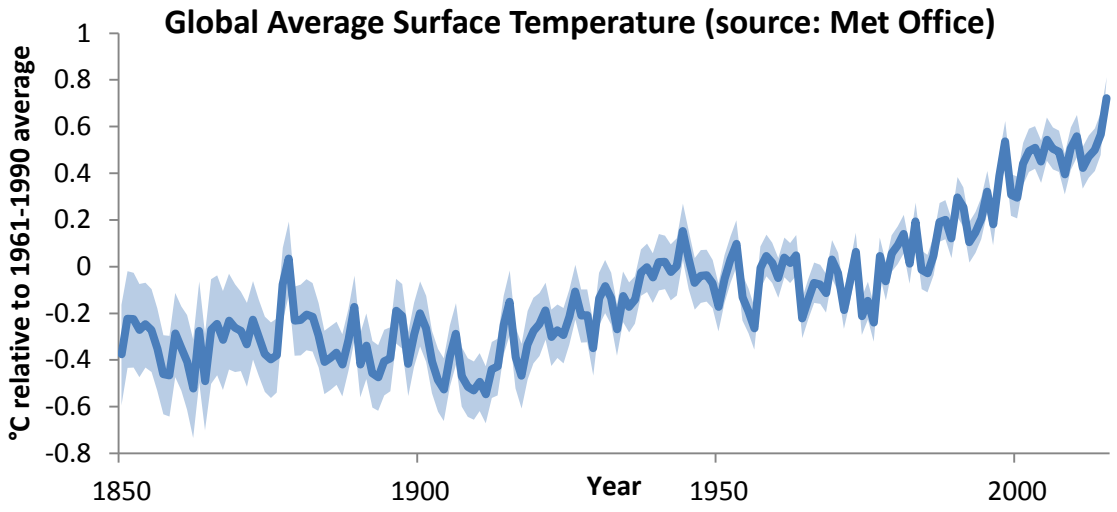
Human activity is enhancing the greenhouse gas effect. In the last century we have been burning increasing amounts of fossil fuels (coal, oil and gas), emitting CO_2 and other greenhouse gases in the process. As a result the level of CO_2 in the atmosphere has broken out of the range seen over the last million years, and the Earth is warming in response.

Natural factors are unlikely to have provided a strong warming influence in recent decades. For instance, measurements of solar output show a slight decrease since the late 1970s.

iii) Evidence of climate change

Climate change is often measured as the average global temperature at Earth's surface. Estimates can be made using thermometer records stretching back to around 1850.

Last year's estimate reached a record high of about 1°C above 1850-1900 levels. Each of the last three decades has been warmer than the last, and together they are the hottest decades since estimates began (see chart below).



Global temperature is only one metric of a changing climate though. Together the various metrics point to a consistent picture of global warming:

- Extreme cold temperatures are becoming less frequent, while extreme heat waves and rainfall are becoming more frequent.
- Sea level around the world has risen by around 20 cm (because water expands as it warms, and because water is flowing into the sea from melting land glaciers).
- Sea ice cover in the Arctic and snow cover over land are also decreasing.

iv) The impact of climate change

Climate change is already having various impacts around the world, for example on flood damages, crop growth, and wildlife.

While it is clear the Earth will keep warming as long as we keep emitting CO_2, the precise impacts are hard to predict. This is partly because the climate system is complicated (and we don't fully understand all of it), and because it depends on our future choices (such as how much more we emit).

If no effort is made to cut global use of fossil fuels, global warming is likely to reach between 2-7°C this century, with further warming beyond. Computer models suggest this would cause large damages to the environment and people, especially in poorer parts of the world.

For comparison, the last ice age (when there were kilometer-thick ice sheets over North America and Northern Europe) was something like 4-7°C cooler than the climate before the industrial revolution.

Reducing global greenhouse gas emissions will reduce future climate change. If emissions can stop growing as soon as possible, be halved by mid-century and reach zero before 2100 then there is a reasonable chance of staying below 2°C.

This would not eliminate all the predicted impacts from climate change, but would reduce many of them substantially.

v) The UK emission reduction targets

Nations around the world have agreed under the United Nations to limit climate change to well below 2°C. The UK has been a longstanding advocate for global action, and recognises that it needs to cut its own emissions alongside all other countries.

The Climate Change Act established a target for the UK to **reduce its emissions by at least 80% from 1990 levels by 2050.** This is designed to be an appropriate UK contribution to a halving of global emissions – it is based on every person in the world having an equal share of emissions in 2050.

To ensure that progress is made towards this long-term target, the Act also established a system of five-yearly carbon budgets (which are caps on emissions) with the first covering 2008-12 and currently stretching out to 2023-2027.

vi) Where do carbon emissions in the UK come from? How can you reduce them?

Carbon emissions come from burning oil and gas to produce electricity, to heat buildings and to fuel our transport system. Heat is also used in manufacturing and oil refineries.

Of the greenhouse gas emissions in 2014, 23% came from burning fossil fuels to generate electricity, **16% came from gas and oil heat in buildings**, 19% came from industry and manufacturing and a further 22% came from burning fuel for transport. Finally, 19% came from emissions of methane and nitrous oxide from agriculture and waste products.

There are two main ways to reduce emissions:

a) **Using energy more efficiently**

There will always be a demand for energy, but it is possible to use it much more efficiently and effectively than we do now. This is true for both consumers and businesses. In many cases, it is possible to save energy and money at the same time. This does not imply cold baths and no cars but does mean a more efficient boiler and driving cars with more efficient engines.

b) **Low-carbon fuels**

There are many opportunities to reduce our dependence on fossil fuels. For example increasing the amount of electricity generated through low-carbon technologies like nuclear and wind, and relying less on gas and coal. This low-carbon electricity can then be used in place of other fossil fuels such as petrol in cars or gas in heating.

About the Committee on Climate Change and Sciencewise

The Committee on Climate Change:-

The Committee on Climate Change (the CCC) is an independent statutory body established under the Climate Change Act 2008. Our purpose is to advise the UK Government and governments of Scotland, Wales and Northern Ireland on greenhouse gas emissions targets. We report to Parliament on progress made in reducing emissions and preparing for climate change.

The Committee on Climate Change's advice on carbon budgets and targets is directly reflected in legislation and the Government's carbon strategy.

Sciencewise:-

Sciencewise is a programme funded by the Department for Business, Innovation and Skills (BIS).

It works to improve government policy making involving science and technology by increasing the effectiveness with which public dialogue is used, and encouraging its wider use where appropriate – and provides specialist and independent advice and facilitation support to help policymakers develop and commission deliberative tools, including dialogue and the Sounding Board, an online tool.

Section 5: Introductory Session Materials

Slide 1

Welcome to the Sounding Board

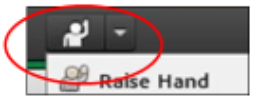
You should be able to hear and talk on this call through your telephone, as well as seeing this presentation on your computer or tablet. The dial-in details for your phone are **0800 376 1896** followed by the code **6004 764 328** and the hash sign (#).

We're doing the audio separately through the phones because the sound quality is better.

If you have any technical problems, please use the Q and A box at the bottom right of your screen and our team will help you.

Once you can both hear the audio through your telephone, and also see this presentation on your screen, please click on the 'raise hand' icon.

You can find this at the top of your screen.



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Slide 2

About the Sciencewise Sounding Board

We're running two separate sessions:

1) **Introductory session:**

Tonight's introduction is mostly an information giving session. The key aim tonight is to get you up to speed on the key issues we'll be discussing on Saturday.

2) **Discussion session:**

On Saturday, we'll be working with you in a more interactive session. We would like to hear your thoughts and perspectives on how to encourage better uptake of low carbon heating technologies.

2

Slide 3

About the project

The Committee on Climate Change are seeking public views about

- **low-carbon heat technologies**
- **the barriers to their uptake, and**
- **solutions that policymakers and society can explore in solving these barriers.**

Your views will help the Committee on Climate Change to better understand informed public opinion about these issues, and to inform their advice and communications strategy.

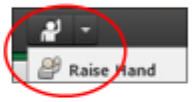
3

Slide 4

Ground Rules

We'd be really grateful if you could:

1) Raise your hand to speak.
2) Try not to speak over other people.
3) Step forward / step back.
4) Use the Q and A box for any technical issues.
5) Keep confidential



The sessions will be recorded and we will ask you to complete an evaluation form about your experience.

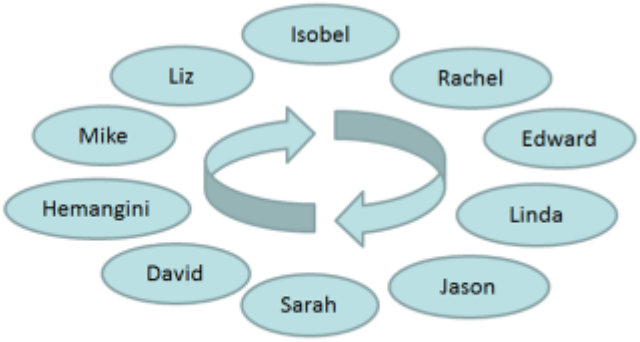
4

Slide 5

Question for discussion

When it comes to replacing your heating system (or choosing a new heating system) what sort of things do you consider in the decision?

We'll move around the table:



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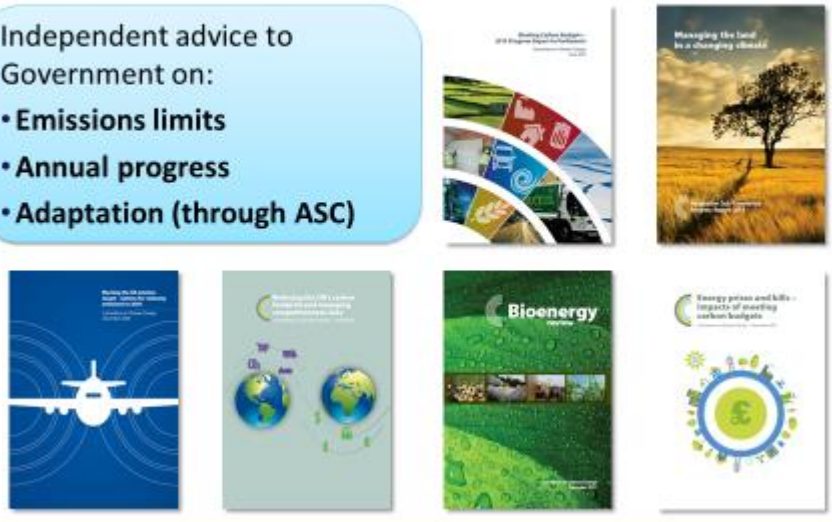
Slide 6

CCC role

Independent advice to Government on:

- **Emissions limits**
- **Annual progress**
- **Adaptation (through ASC)**



Slide 7

How do we heat our homes?

Gas boilers

Can provide all your central heating and hot water.

Example – **3-bed semi detached home**

- Capital Cost: Around **£2,000**
- Running Cost: **~ £700** a year

Slide 8

How do we heat our homes?

Electric Heating

Can **provide all your central heating** and **hot water**.

Storage heaters / Air or oil heaters / Electric boiler

Carbon emissions depend on power sector.

Example – 3-bed semi detached home:

- Capital Cost: Low **~ £100 - £2,000**
- Running Cost: High **~ £1,000 - £1,500**

Slide 9

Heat Pumps – 'A Fridge in Reverse'

Air source heat pumps

- **2-3 units of heat** for **every unit** of electricity
- Basic **home insulation is required** and a radiator upgrade may be needed. Space / noise.
- Capital Cost: **~ £7,000 - £8,000** for **a 3-bed home**.
- Running Cost: Similar to gas heating, lower for more efficient systems **(~ £500 – 600)**

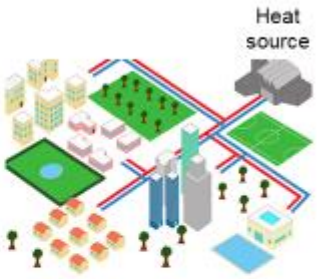
Ground source heat pumps

- More efficient
- Higher capital costs and lower running costs

Slide 10

Low-carbon heat networks

A heat network provides **heat generated from a local source** to more than one building or home via **a network of pipes.**



- Householders can **control when the heating comes on** and the **temperature**.
- The control unit would **take up less space** than a standard boiler.

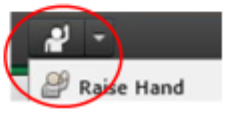
- Costs: Designed to be **lower than gas heating overall,** including the capital costs of the gas boiler.

Slide 11

Questions for clarification

Please raise your hand using this icon

- Anything you didn't understand?
- Anything that was unclear?
- Any extra information you need?



If you can lower your hand by clicking on the icon again after you've spoken that would be much appreciated.

11

Slide 12

Two opinion polls

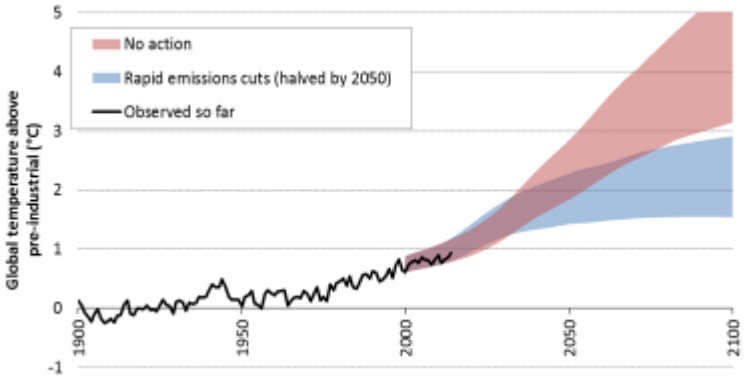
Answer the two poll questions on the screen by clicking on the number that best represents your view.

12

Slide 13

Climate change: present and future

- Natural variations, but a clear warming trend from emissions in recent decades
- Impacts on people and nature are very uncertain, but likely large
- Reducing emissions will lessen future change and reduce the risk of large impacts occurring



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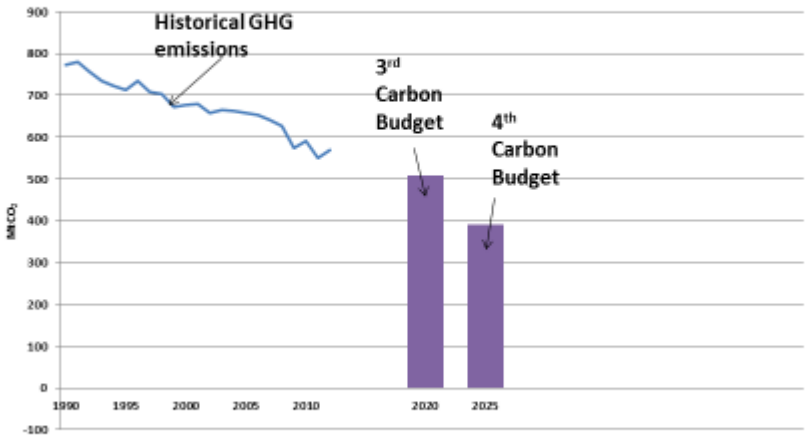
Slide 14

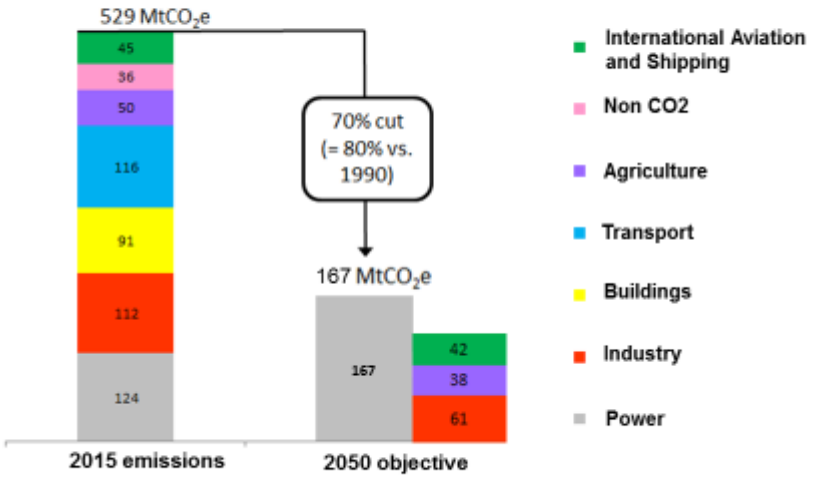
UK progress and targets for reducing emissions



Note: the targets on this chart do not include international aviation and shipping emissions since they are not included in carbon budgets

Slide 15

The UK 2050 objective



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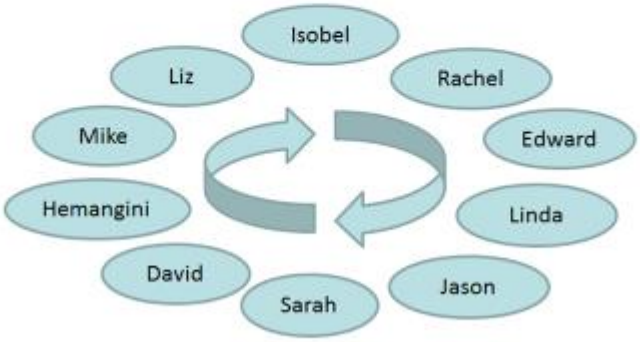
Slide 16

Initial Reactions

What are your initial reactions to this information – and does this change what you've been thinking?

We'll move around the table.



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Slide 17

Existing research on the barriers

Existing research has identified the following issues to uptake of low-carbon heating (besides cost)

- Lack of awareness
- Lack of interest
- Lack of trust
- Perceived poor quality and reliability
- Space requirements and aesthetics
- Perceived hassle
- Lack of control over heating supply

17

Slide 18

What has been tried already?

Barriers	Solutions	
Lack of awareness	Raising awareness	Use of local volunteers to promote technologies
Lack of interest		Visible local authority support
Lack of trust	Improve understanding & confidence	Providing comparative information on energy usage
Perceived poor quality and reliability		setting up a dedicated low carbon advice centre
		providing access to show homes
		Accreditation of installers
Perceived hassle	Making it easier	Initiatives to reduce 'hassle factor' (such as loft clearing services)

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Slide 19

On Saturday, we want to hear your views on:

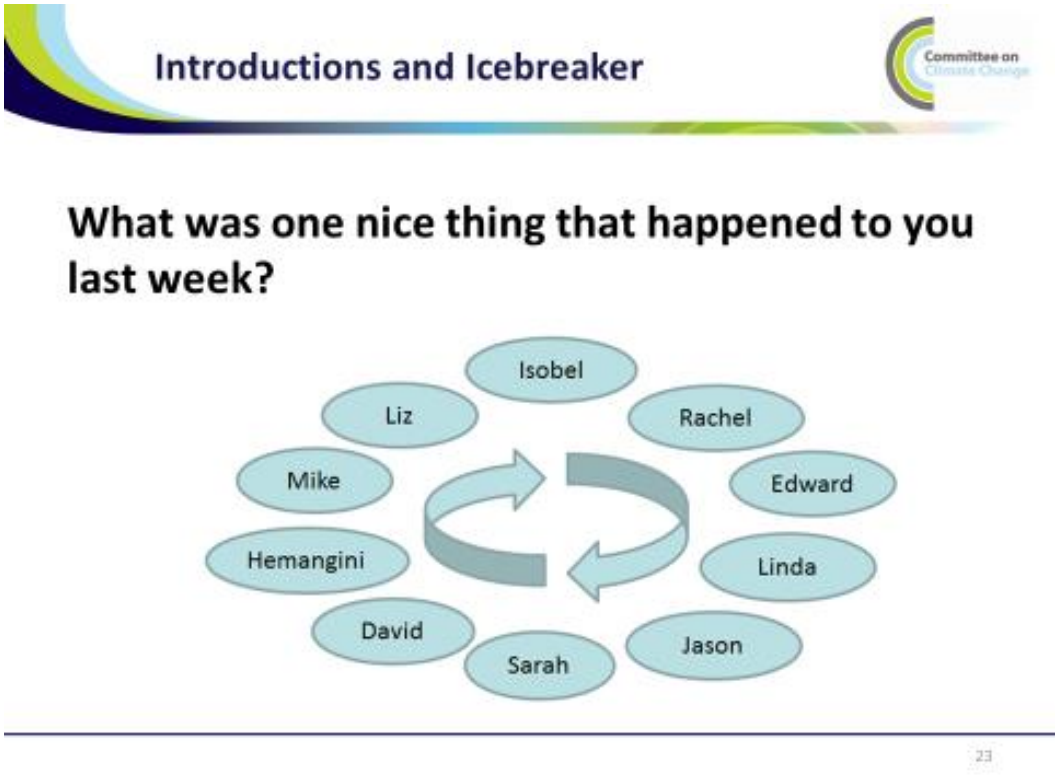
- Solutions to some of the barriers
- Your thoughts on some different scenarios
- The role of government in developing solutions

19

Section 6: Deliberative Session Materials

Slide 1

Slide 2



Slide 3

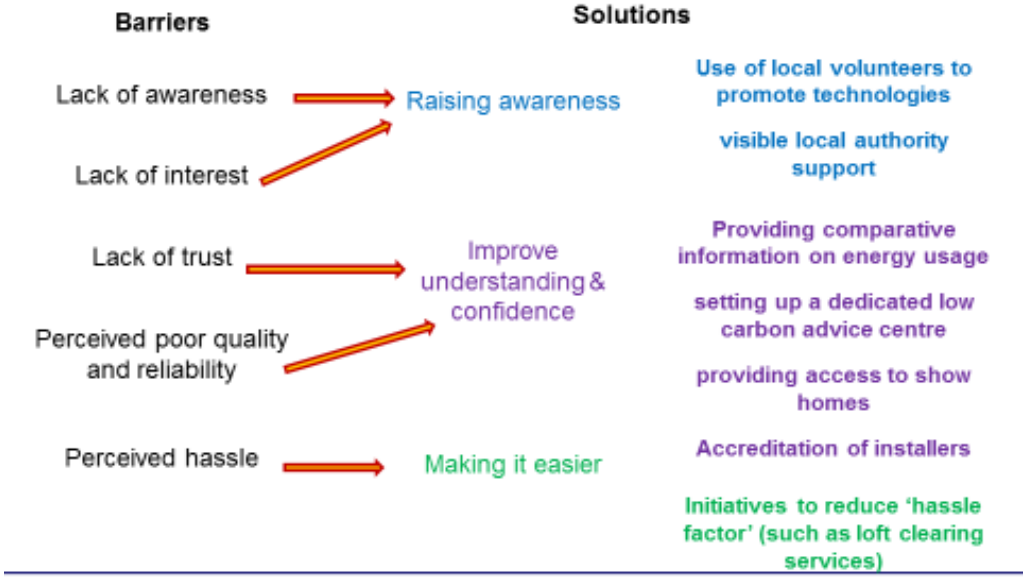
Quick recap…

- 2050 **target to reduce carbon emissions by 80%**
- This requires **decarbonising domestic heating** and moving away from gas
- Low-carbon technologies available include **heat pumps** and **heat networks**
- Number of **reasons (besides from cost)** that people have for not switching

24

Slide 4

What has been tried already?



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Slide 5

Recap of heat technologies

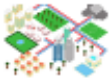
Gas Boilers

- Capital Cost: Around **£2,000**
- Running Cost: **~£700** a year

Electric Heating

- Capital Cost: Low (**£100 - £2000**)
- Running Cost: High – 2x running cost of gas heating (**£1000 – £1500**)

Heat Networks



- Can **control when the heating comes on** and the temperature.
- Costs: Designed to be **lower than gas** heating overall.

Heat Pumps

- Capital Cost of air-source heat pump: ~ **£7,000 for 3-bed home**
- Running Cost: **Similar to gas** heating
- **Basic home insulation is required** and a **radiator upgrade** may be needed
- **Space requirements** / some noise

Slide 6

Scenario 1

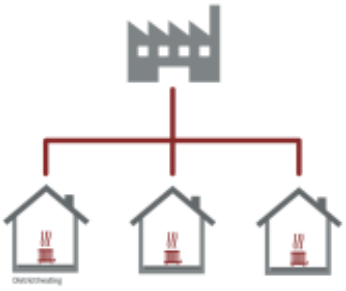
Slide 7

Moving home to a low-carbon district heating zone

You will be connected to the local heat network when your gas boiler is up for renewal.

It will be installed free of charge.

It is guaranteed that your heat will be cheaper than gas heating over the 20 year contract period.



Question

Would you consider moving to a house in a low-carbon heating zone? What would you like to see in place to feel happy to move here?

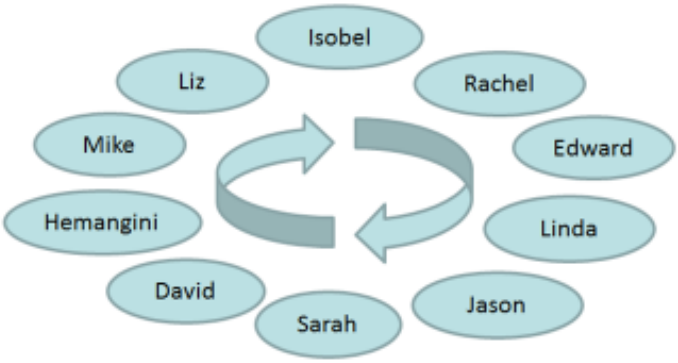
27

Scenario 1

Question

Would you consider moving to a house in a low-carbon heating zone? What would you like to see in place to feel happy to move here?

We'll move around the table:



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Slide 8

Scenario 2

Renewing your existing heating system

There is no local heat network to connect to.

You can choose any other heating technology you like.

Incentives are in place to make all technologies cost about the same

Question

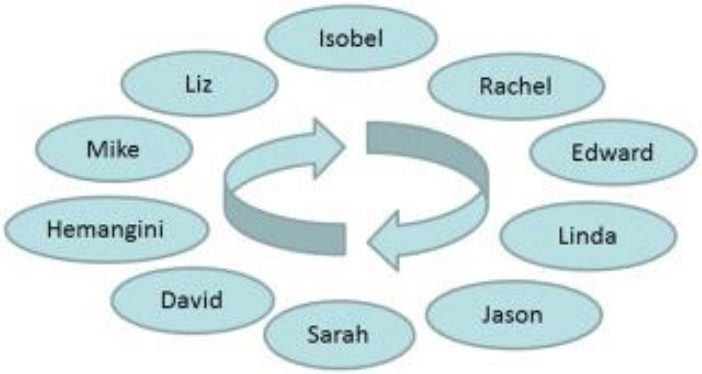
What would need to be in place for you to choose a heat pump?

29

Slide 9

Scenario 2

Q: What would need to be in place for you to choose a heat pump?



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Slide 10

Recap from session 1: non-financial barriers

- Lack of awareness
- Lack of interest
- Lack of trust
- Perceived hassle
- Perceived poor quality and reliability
- Space requirements and noise
- Lack of control over heating supply

31

Slide 11

Opinion Poll – Choice vs. Cost

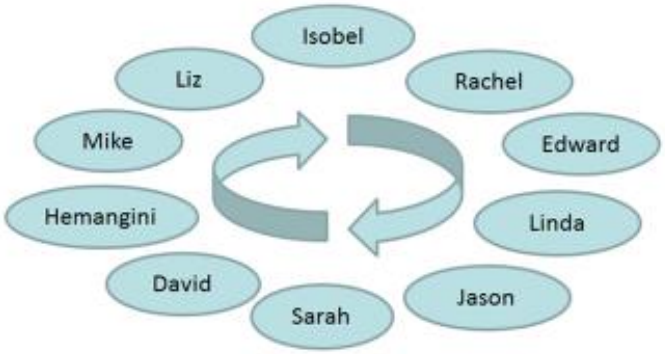
Answer the poll question on the screen by clicking on the number that best represents your view.

32

Slide 12

Discussion – Polling responses

Why did you respond how you did? What would reassure you in this situation?



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Slide 13

3 opinion polls

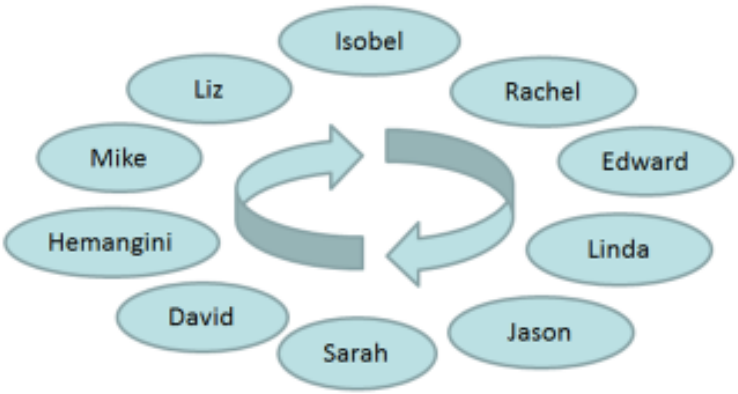
Answer the 3 successive poll questions that come up on the screen by clicking on the number that best represents your view.

34

Slide 14

Reflections on poll questions

Has your opinion changed since the first session? Why did your views change (or stay the same)?



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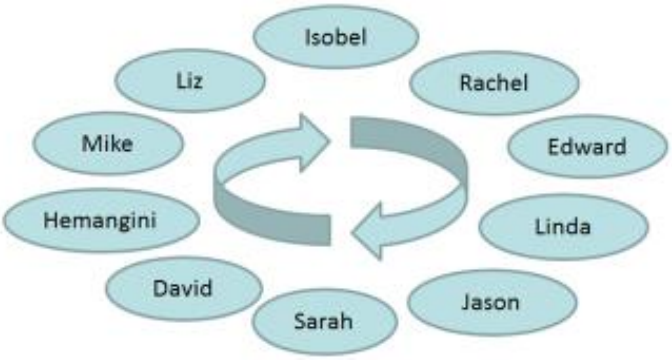
Slide 15

The role of government

What do you think the role of government is in supporting the public to reduce carbon emissions through heating?



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Slide 16

Next Steps

1. **Evaluation form**
2. **Payment process**
3. **A write up will be shared**

Thank you very much for participating!

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