Citizens Panel

Decarbonisation of home heat

Wales & West Utilities

TRAVERSE

WALES&WEST UTILITIES

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Foreword

Responding to climate change will affect virtually everything we do as a country and as a company. In recent years, awareness of energy and environmental issues has grown and there is a strong will for action from consumers. However, the rising cost of living and energy prices mean that decision makers must be sensitive to real and growing challenges around who pays for change and how.

Heat decarbonisation is perhaps the greatest challenge the UK faces in reaching net zero by 2050: it will mean changes to the way we heat and live in homes across the UK.

Understanding consumer priorities and concerns is vital to delivering this transition, which is why we put together our Citizens Panel. The Panel is a key tool in helping us to get beneath the surface of these challenges and understand what is important from the perspective of real people living and working in our network operating area. We are very grateful for Panel Members' participation and have enjoyed the insightful discussions that have been had to date.

The findings demonstrate the value that consumers place in reliable infrastructure and minimised disruption. Consumers are generally open to change, but highly aware of potential costs and risks of disruption. We recognise they are also sceptical of the environmental claims related to low carbon technologies. Communication and independent information are key to a successful transition, where technical jargon and confusion around different technology choices risks undermining progress. Information needs to be presented in a clear and accessible way for all. Our Citizens Panel shows that clear, accessible information helps people understand the challenge we're facing and consider some of the options the UK is exploring, like using hydrogen for domestic heat.

Wales & West Utilities will play a full part in delivering a decarbonised energy system and looks forward to continuing to engage customers as we deliver this journey.

Matt Hindle

Head of Net Zero & Sustainability,

Wales & West Utilities

Executive summary

Overview

In early 2021, Wales & West Utilities (WWU) and Traverse, an independent social-purpose research consultancy, trialled a Consumer Panel – a deliberative forum where a small group of customers could engage with WWU's business plan, wider strategic aims of the company and look at key issues in the sector.

Following a change from 'Consumer' to 'Citizens' Panel and with some new members, it met again in February 2022. The purpose of this round of Panel engagement was to:

- Understand how the public is likely to make choices during the transition to low carbon heating in the next 10 years.
  - Gain insight from customers on how they make other major purchases.
- Explore attitudes towards hydrogen as a low carbon form of heating.
- Gain feedback on the materials used (e.g. their language and accessibility).

A total of 26 Panel Members, broadly reflective of WWU's regions, took part – 20 who took part in the trial and 6 who were newly recruited. The engagement was split into 3 core phases, along with a set up/onboarding pre-phase.

Phase	Phase 0 – Re-introducing the Panel	Phase 1 – Net zero and low carbon & getting to know your group		Phase 2 – Future of low carbon heat		Phase 3 – Role of hydrogen & final reflections	
Date	4th – 8th Feb	9th Feb (workshop)	10th – 15th Feb (Recollective)	16th Feb (workshop)	17th – 22nd Feb (Recollective)	23rd Feb (workshop)	24th Feb – 2nd Mar (Recollective)
Objective	▪ Equip participants to engage using the online tools ▪ Introduce the topic (decarbonisation) the sessions will look to discuss	▪ Introduce participants to the decarbonisation of domestic heat and build group relationships	▪ Equip participants to engage using the online tools ▪ Introduce the topic (low carbon heating) the sessions will look to discuss	▪ Participants deliberate on the changes they will make as consumers/citizens to reach net zero	▪ Participants reflect on information they've received and their own views	▪ Participants consider low carbon heating options in relation to other major purchases & assess their level of comfort towards hydrogen	▪ Participants reflect on the process and give feedback ▪ Participants give clear sense of how comfortable they would be with hydrogen

Making choices during the transition to low heating in the next 10 years

Panel Members identified cost as their biggest concern about the transition to low carbon heating, and a key factor in shaping how they would make their decision. Concerns around rising costs also impacted other views Members had, such as the

lack of meaningful choice in decarbonising their homes, with prohibitive costs making some options unachievable. Even when people would be able to make a choice, Members felt most people would have to go with the most cost-effective option, even if this was at the expense of the environment. This was compounded by a perceived lack of support (both in terms of clear, accessible information and financial support) from institutions to help the public decarbonise.

Members also wanted to see disruption minimised, from ensuring the rollout is well planned, to the presence of trained professionals to install and maintain new low carbon heat technologies.

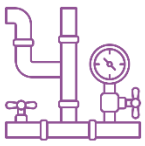
Alongside the desire for clear, accessible, high-quality information and tech support, they also valued doing their own research – but putting most trust in friends, family and neighbours. Some Members also felt a level of scepticism towards any new technology's claim to be environmentally friendly, citing claims around diesel cars as an example.

Attitudes towards hydrogen as a form low carbon heating

Some of the key concerns raised in relation to low carbon heating technologies in general, also applied to hydrogen – in particular the lack of clarity around future running costs. Other concerns around scalability, safety and the risk that the technology would become obsolete, were raised specifically about hydrogen.

While concerns remained around the cost of any new low carbon heat technology, Panel Members liked the fact installation costs would be lower for hydrogen than some of the alternatives.

When asked whether they would take part in a trial for hydrogen heating, some felt concerned at the potential risks, particularly around safety and would need reassurance before agreeing to it. Others already felt reassured and most would be comfortable with joining a trial, providing there was some kind of incentivisation for those taking part. One group, while agreeing that those taking part would need to have some kind of incentivisation, also liked the idea of being a 'pioneer' and one of the first in the UK to get a hydrogen boiler.



The role for Wales & West Utilities

Members generally agreed that Wales & West Utilities was well placed to have a key role in the transition to low or no carbon home heat, and more specifically to hydrogen. This role was split into two core responsibilities, where public trust would be vital:

- Delivering reliable infrastructure and minimising consumer disruption through the transition.
- Raising awareness of the need for change and wider context around reaching net zero, and what Wales & West Utilities' role in the change will be.

The transition to low carbon heating also represented an opportunity for Wales & West Utilities to collaborate, both with the big public and private organisations who will have a necessary role in the transition, and with smaller scale stakeholders who have a lot of customer interaction, such as plumbers and those repairing boilers.

Accessibility of materials

Generally, Panel Members found the materials easy to understand. They felt that the visual aids, such as videos, in the early weeks were particularly helpful in digesting a lot of information in the early phases of the project.

Some Members however found the volume and pace of information in the early stage of the project challenging. While this generally eased in latter weeks and activities, some Members found specific topics, such as hydrogen production, particularly complex.

Panel Members saw a key role for Wales & West Utilities in raising awareness of the upcoming consumer change. For this to be successful, information needs to be both accessible (can I, as a citizen, understand it?) and transparent (can I, as a citizen, trust that they are telling me what I need to know?).

Introduction

1. Overview

Traverse is an independent social-purpose consultancy that supports better decision making through the power of inclusion.

In November 2020, Wales & West Utilities appointed Traverse to design and deliver engagement with a panel of customers that could run throughout the RIIO-GD2 business plan period (2021-2026). The panel was set up for Wales & West Utilities to regularly gain qualitative public insight on topical subjects and business decisions. The panel launched with a trial in Spring 2021, with an evaluation process to draw out process learnings. Following the success of this trial, the Panel was taken forward (see section 3.3 of this chapter for how it changed from a Consumer Panel to a Citizens Panel).

This report covers the engagement objectives, methodology and findings of the Spring 2022 panel round.

2. Objectives & research questions

Wales & West Utilities wanted to engage the Panel about the future of heat and the role of hydrogen in the transition to low or no carbon home heat.

At the start of the project, three core objectives were agreed between Wales & West Utilities and Traverse. At a design session, these objectives were turned into research questions, which would inform the design of the overall process – see figure 1.

Objectives

1. Understand how the public is likely to make choices during the transition to low carbon heating in the next 10 years.
   - Gain relevant insight from customers on how they make other major purchases.
2. Explore attitudes towards hydrogen as a low carbon form of heating.
3. Gain feedback on the materials used (e.g. language and accessibility)

so the engagement must be designed to answer…

Research questions

1. How would participants make choices about changing to low carbon heating in their homes?
   a) What would their hopes and concerns be?
   b) What criteria would they base their decision on if they were the decision-makers?
   c) What expectations would you have if you were tenants / not the decision-maker?
   d) What information would they want, how do they want to be engaged and who by?
   e) What barriers do participants think their local community would face to making changes to their homes?
   f) How do participants make decisions about other major purchases?
      i. How have they made choices in the recent past?
      ii. What would they base their decisions around purchasing/using an electric vehicle on?
2. How comfortable would participants be using hydrogen for domestic heating (heating, hot water, cooking)?
3. Which materials do participants find clear and accessible, and what do they struggle to understand or think is unclear?

Figure 1 – Citizens Panel objectives and research questions

3. Approach

3.1. Traverse's model of deliberation

Deliberative democracy supports the view that fair and reasonable discussions amongst citizens should be the source of legitimacy for law, rather than merely voting.

Deliberative engagement takes this theory and applies it to decisions and policies made by organisations of all shapes and sizes.

Traverse's model of deliberation has four key principles:

1. **It is a learning experience concerned with evidence**. Providing balanced information to participants, in an accessible format and without bias. Subject matter specialists are a key part of the approach, providing different perspectives, particularly on future-oriented subjects, and allowing participants to question information. Where subject matter specialists have an organisational perspective on an issue, this is made clear to participants.
2. **It is long-form and reflective.** A deliberative process involves the development of views over time to move beyond initial surface reactions that you might get in focus groups or interviews. Discussions are usually held over a number of hours and sessions, with time within, and between, for participants to reflect.
3. **It involves a diversity of voices.** People from different backgrounds are invited, to draw out the range of public opinion; break-out groups are mixed so that participants can offer, hear and discuss different perspectives.
4. **It embraces complexity while exploring consensus.** Deliberation allows for the exploration of the 'why' behind views, problematising the topic to allow for participants to consider trade-offs. The process may be designed to build consensus or reach recommendations, but it will always embrace complexities rather than over-simplifying.

3.2. Delivering the Panel online

Given the background of uncertainty around Covid-19 and related restrictions, Traverse designed the process to be delivered online – from synchronous online workshops to asynchronous activities on an online platform (Recollective). See Methodology chapter for more information about how the Panel was delivered.

3.3. Becoming a Citizens Panel

Prior to this round of Panel meetings, Wales & West Utilities and Traverse agreed to update the format – from a Consumer Panel to a Citizens Panel.

While customers are central to shaping a company's direction and improving their decision making, best practice engagement on complex and future-oriented decisions, looks to engage participants as citizens.

This approach seeks to build on their perspective as customers, encouraging them to think about issues and problems from other customers' or stakeholders' perspectives, as well as its wider societal impact. This is particularly important on topics such as decarbonisation and climate change, where encouraging participants to think of themselves as citizens, rather than just as customers, can empower them to play a positive part in the transition to net zero.

4. Reading this report

4.1. Use of quotes

Quotes are used throughout the report to illustrate points, not replace narrative. When using participants' own text, these are provided verbatim, without changes to spelling or grammar although square bracket additions are used, on occasion, to clarify. The data the quote has been drawn from is also provided by a caption explaining the region they are from (and if applicable, if they were in a mixed group), whether the quote is from a workshop or online platform (Recollective), and when in the process it is from. For example:

"this is a quote"

Southwest England Panel Member, workshop, week 3

4.2. Qualitative engagement and quantifiers

The number of participants (26), and qualitative approach, mean that findings should be considered illustrative rather than statistically representative of public views.

On this basis we have agreed not to use strict quantifiers – although areas of strong consensus have been identified. Terms such as 'a few', 'some', 'many' indicate where a position was held by more than one, and less than half.

Where differences have been identified by location these are noted in the text. Differences between locations should not be interpreted as geographical patterns. As with all research, this report is a snapshot in time. People's views may change significantly in the future.

4.3. Panel Members

Throughout the report, participants in the Citizens Panel are referred to as 'Panel Members' or 'Members'.

Methodology

1. Online Citizens Panel

1.1. Recruitment

The majority of participants who joined the Panel for the trial in Spring 2021, remained on the Panel for this round of engagement (20 out of 27). An additional 6 were recruited by external partner Riteangle, who had carried out the initial Panel recruitment. Demographic data for the full Citizens Panel can be found in the Appendix 2, however the additional participants were recruited on the same basis as for the Trial – to be broadly reflective of Southwest England, South Wales, or Mid-North Wales.

Figure 2 - Panel Members in WWU operating area

A key consideration from the trial stage of the Citizens Panel was to explore reducing breakout group size. As such, at this round of Panel meetings, breakout groups were made up of 6-8 Members, rather than 9-10.

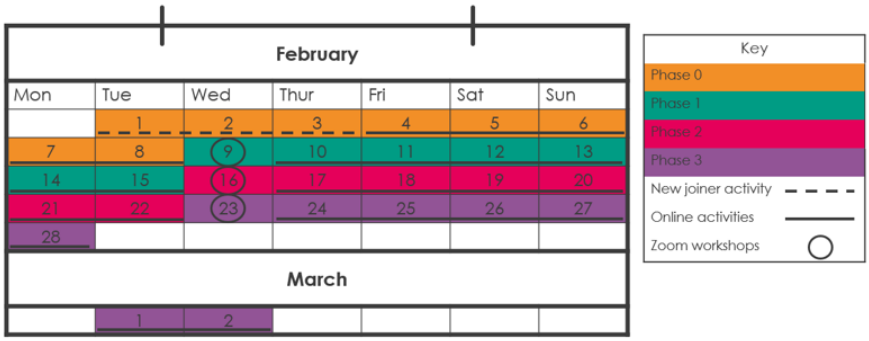
Through natural attrition and new Panel Members, we were able to keep the three regional groups from the trial and have a fourth, mixed location group, consisting of entirely new Members – with two from each region.

Additionally, as two of the three regions that Wales & West Utilities serve are in Wales, we accommodated Welsh speaking Members by working with a Welsh speaker to facilitate the North and Mid Wales group. Panel Members were asked in advance of the process by the recruiter, if they would be happy to take part in English; nobody was deterred by this from taking part. Presentation slides were translated to Welsh and made available, and the Welsh facilitator was available for any Welsh language needs.

Panel Members were incentivised to take part, with the possibility of earning up to £200 for completing a pre-workshop task, attending all three Zoom workshops and completing three sets of online Recollective activities. In addition, new recruits were given £25 for completing a new joiner task, intended to get them up to speed for this round of engagement.

1.2. Platforms used

We chose to use **Zoom** as the platform for workshops, due to increased public experience of using it in the last two years, as well as its stability and functionality. The sessions included a mix of plenary and breakout groups, supported by Traverse lead and group facilitators and note-takers.



We chose **Recollective** for all non-workshop activities due to its functionality and familiarity with the majority of Members, who had used it in the trial.

Figure 3 - Overview of platforms used

2. Design

When designing a deliberative engagement process, Traverse typically uses a three-phase framework – see figure 4.

Figure 4 – Three phases of deliberative engagement

Traverse designed the engagement process in three main phases, with a 'Phase 0' to onboard the panel:

1. **Information giving:** Introducing net zero and low carbon heat & getting to know your group
2. **Deliberating and reflecting:** The future of low carbon heat
3. **Conclusions:** consolidating views about major purchases & the role of hydrogen

A breakdown of the full process plan can be seen in figure 5.

Phase	Phase 0 – Re-introducing the Panel	Phase 1 – Net zero and low carbon & getting to know your group		Phase 2 – Future of low carbon heat		Phase 3 – Role of hydrogen & final reflections	
Date	4th – 8th Feb	9th Feb (workshop)	10th – 15th Feb (Recollective)	16th Feb (workshop)	17th – 22nd Feb (Recollective)	23rd Feb (workshop)	24th Feb – 2nd Mar (Recollective)
Activity summary	▪ New joiners given 'catch up' task ▪ Review materials from trial	▪ Introduce decarb of home heat ▪ Breakout group intro ▪ Group disc on materials	▪ Reflection questions ▪ Feedback on materials ▪ Questions for WWU	▪ Story stem: imagine your low carbon heat home in 10 years ▪ Develop and use personas to identify barriers	▪ Identify key decision-making criteria ▪ Identify key barriers to low carbon heat ▪ Decide how you want to be engaged & who you'd want to hear from	▪ Presentations on consumer protection & hydrogen ▪ Group disc on these topics	▪ Provide feedback on the process ▪ Explain your level of comfort with hydrogen
Objective	▪ Equip participants to engage using the online tools ▪ Introduce the topic (decarbonisation) the sessions will look to discuss	▪ Introduce participants to the decarbonisation of domestic heat and build group relationships	▪ Equip participants to engage using the online tools ▪ Introduce the topic (low carbon heating) the sessions will look to discuss	▪ Participants deliberate on the changes they will make as consumers/citizens to reach net zero	▪ Participants reflect on information they've received and their own views	▪ Participants consider low carbon heating options in relation to other major purchases & assess their level of comfort towards hydrogen	▪ Participants reflect on the process and give feedback ▪ Participants give clear sense of how comfortable they would be with hydrogen

Figure 5 - Citizens Panel process plan

Presentations, followed by a Q&A, were given at key points of the engagement process:

- Who Wales & West Utilities is, workshop 1, delivered by Wales & West Utilities
- Net zero and low carbon heat, workshop 1, delivered by Climate Change Committee
- What gas companies are doing about [net zero and low carbon heat], workshop 1, delivered by Wales & West Utilities
- Home heating, major purchases and consumer protection, workshop 3, delivered by Energy Savings Trust
- The role for hydrogen in reaching low carbon heat, workshop 3, delivered by Wales & West Utilities

Panel Members were asked at six points in the engagement process to complete a 'tracker' question on how comfortable they would feel if their home was supplied by hydrogen instead of natural gas.

Findings

1. How would Panel Members make choices about changing to low carbon heating in their homes?

Snapshot summary findings

- Throughout the engagement, Panel Members were encouraged to think about decarbonising home heat. They thought about their hopes and concerns, how they would make decisions and what barriers they and others might face.
- Cost was the most prominent theme and was often the overarching factor for panel members when talking about their hopes and concerns and, how they would make decisions about their home heating choices. Renting or homeowning often shaped discussions as Panel Members felt that issues of cost presented differently if individuals were renters or homeowners. They struggled to imagine any meaningful choice around their options for decarbonising their homes, describing costs as prohibitive. They felt that most people would have to go with the most cost-effective option, which they thought might not be the best option for the environment. This is perhaps unsurprising given the current back drop of the energy crisis.
- They expressed frustration at the perceived lack of support for the public to decarbonise, particularly in relation to finances and a lack of information to help them make informed decisions.
- Some Panel Members were worried about disruption to their homes and communities during the transition to low carbon heat. They wanted to make sure appropriate planning had been done and that there would be trained professionals ready to install and maintain new low carbon technologies in homes.
- Panel Members expressed a desire for high quality information and accessible technical support for low carbon heating options. Many had little to no knowledge of alternative fuels like hydrogen prior to the panel.
- Personal research was an important factor for members making decisions on major purchases. Generally, panel members would trust information from people they know (family, friends, and neighbours) over online reviews.
- Overall, throughout the discussions Panel Members were hopeful yet distrustful about the environmental credentials related to the decarbonisation of home heat, particularly claims of them as environmentally friendly alternatives.

1.1. What would their hopes and concerns be?

Panel Member's hopes and concerns were interlinked. Without knowing exactly what decarbonising home heat would look like in the future, they often felt concerned yet hopeful around the same themes.

Cost: Some Panel Members were hopeful that **a move to low carbon technologies could be cheaper for households** in the long run, or at least not higher than present. They hoped that **carbon neutral energy would finally be the more economical option,** making it easier to make greener choices. Others were hoping that prices for new technologies would reduce as they became more established.

"I hope it becomes more accessible to be carbon-neutral, and easier, because it is always cheaper to not be carbon-neutral. I want it to come the other way round."

Mixed Panel Member, workshop, week 2

Panel Members were also **concerned about the cost of switching to new low carbon technologies.** For example, many spoke about the price of installing a new boiler, a heat pump, or making other adaptions to the home such as insulation. They felt that for most households, choices are limited to what they can afford to do, and if a higher carbon option is cheaper, then that would have to be the option chosen.

"Cost is important. I don't have thousands of pounds lying around. If my boiler acted up today, I'd look to the future, do a bit of budgeting, and work out how I could proceed."

Southwest England Panel Member, workshop, week 3

There was also **concern for the everyday cost to households through their energy bills.** Many raised questions as to how using hydrogen for example would affect energy bills. They were concerned about a lack of support for households - particularly those on low incomes - if energy bills were to increase. See Findings Chapter 1.4 for more about views on the impact on low income and vulnerable households.

Low public awareness, lack of information and uncertainty: Panel Members spoke a lot about their **feelings of uncertainty**. Many felt that compared with other modern technologies such as electric vehicles, there was less awareness around decarbonising home heat.

"We're having the conversation about electric cars, we all know about them, whereas nobody knew about the low carbon heating. We need to be more informed. I don't know how I would proceed."

Southwest England Panel Member, workshop, week 3

Many spoke of **not knowing where to go to educate themselves**. They were concerned about the lack of certainty about hydrogen in particular. For example, its cost to households and the economy and how it will be rolled out across the UK. Some Members were concerned about whether it really will turn out to be more environmentally friendly than natural gas (see Findings Chapter 2).

Environment: Hopes for the future of the environment was a strong theme in the individual reflections on Recollective. Panel Members felt **optimistic that time and effort were being put into greener energy solutions.** Most felt that these efforts would support the UK to reach net zero in good time.

"I believe that with the right research and campaigning, most homes' heat could be at a net zero state by the goal of 2050"

South Wales Panel Member, Recollective, week 1

However, Panel Members had **concerns about the environment** as well, that came across strongly through individual reflections on Recollective. Many were concerned about the production of Hydrogen in particular. They were sceptical that it would be produced in the most environmentally friendly way (although this view was less common by the final week, when Members looked at hydrogen specifically). Most felt that this would be linked to cost and that – in the end – the cheapest option will be taken forward, not the best option for the environment.

"It seems to me yes there are choices, but inevitably it will come down to cost instead of carbon neutral."

Southwest Panel Member, Recollective, week 1

Panel Members felt that **awareness of the drastic action needed** to support an energy transition was finally spreading and that most would do their bit to support it. Some felt that Hydrogen – at least in theory - looked like a viable option to reduce emissions (see Findings Chapter 2 for more information on attitudes towards hydrogen).

"I'm optimistic about how this subject is getting to everyone now. And most people are aware of how bad our actions are affecting the environment which hopefully will lead to most people to start doing things which can help the environment."

Southwest Panel Member, Recollective, week 1

Fairness: Panel members in South Wales in particular, were **concerned about how this transition would happen fairly** and who would support households to make the transition. They were concerned that the burden would be felt most on households considered too affluent for government support but unable to make costly changes. They felt that everyone should have support to make the changes needed to their homes as incomes are already squeezed for most people. There was concern that some people would get left behind.

"It feels like everything is changing at once, the cars, the heat pumps etc everything is a big expense and there are low incomes incentives but the average person is left with virtually no income after paying for everything so I think everyone should be offered some type of incentive or support."

South Wales Panel Member, workshop, week 3

A few Panel Members were also **concerned about those in rural areas**. They felt that changes were likely to be rolled out in urban areas earlier, leaving rural populations behind.

"It seems to be ok if you live in populated areas but in rural areas people will not be able to benefit and that 2035 isn't that far away."

North Mid Wales Panel Member, Recollective, week 1

There was general agreement across most Panel Members about the scale of action needed to decarbonise home heat. There were concerns about how this will be done fairly and efficiently.

"…how would they inform everybody? It is quite a big thing and until now I hadn't thought about this, but now we are talking about the entire country having to replace their boilers. This is massive."

Southwest England Panel Member, Workshop, week 2

Planning and transition: A few Panel Members were **hopeful that the operation would be well planned**, resulting in households barely noticing the transition. They were also optimistic about safety. They noted for example that hydrogen was as safe as natural gas.

"I thought we would know more difference as a consumer. But as a consumer we won't notice the difference…we wouldn't know which gas was coming through. Natural gas is already very explosive for example."

South Wales Panel Member, workshop, week 2

A few Panel Members expressed **concern about trustworthy and qualified fitting of new technology in homes.** They felt that as these technologies were new there may be a lack of qualified individuals available to fit them, and that maintenance may be a problem moving forward.

"…having trained professionals that know what they're doing, especially because it's new, there might not be that many people who are qualified."

North Mid Wales Panel Member, workshop, week 3

For concerns about the safety of hydrogen see Findings Chapter 2.

1.2. What criteria would they base their decision on if they were the decision-makers?

Panel Members felt that for household decision makers, **the main criteria would be cost.** For most, this was installation costs as this would be a substantial challenge for homeowners. The potential for reducing their monthly energy bills in the future was also a key driver in decision making, but Panel Members weighed this up against

initial outlay. They were keen to point out that cost would be a significant barrier to many of the choices discussed.

"…it doesn't matter what the options are, if you can't afford it it's not an option. Affordability is very important."

South Wales Panel Member, workshop, week 2

Panel Members felt that **future proofing property** was also a key issue in decision making. They knew that homes will be subject to minimum standards in energy efficiency and thought that homeowners will need to be compliant to sell their homes in the future.

"For me it is primarily about the cost, I don't intend to stay here forever so I want to make sure its eco-friendly and efficient so people would come in and think they want to buy it as everything is in place and there are no added costs for them."

South Wales Panel Member, workshop, week 2

Some Panel Members acknowledged that **they wanted to make changes for the environment and future generations,** but felt that cost made it impossible for them to make sustainable choices.

"Cost, reliability, safety will be the main factors. As much as people want to do sustainability, you need to have a certain income to make those decisions anyway. If you're struggling to pay for other things, it'll be difficult to switch to something more sustainable. If it's that eating or heating choice"

North Mid Wales Panel Member, workshop, week 2

The graph below (figure 6) shows what panel members chose to base their decisions on if they were the decision makers. Criteria were taken from workshop discussion to inform this activity. It shows how many times each criteria was a top three choice. Installation costs were by far the most important criteria for panel members, followed by safety and ongoing energy bills.

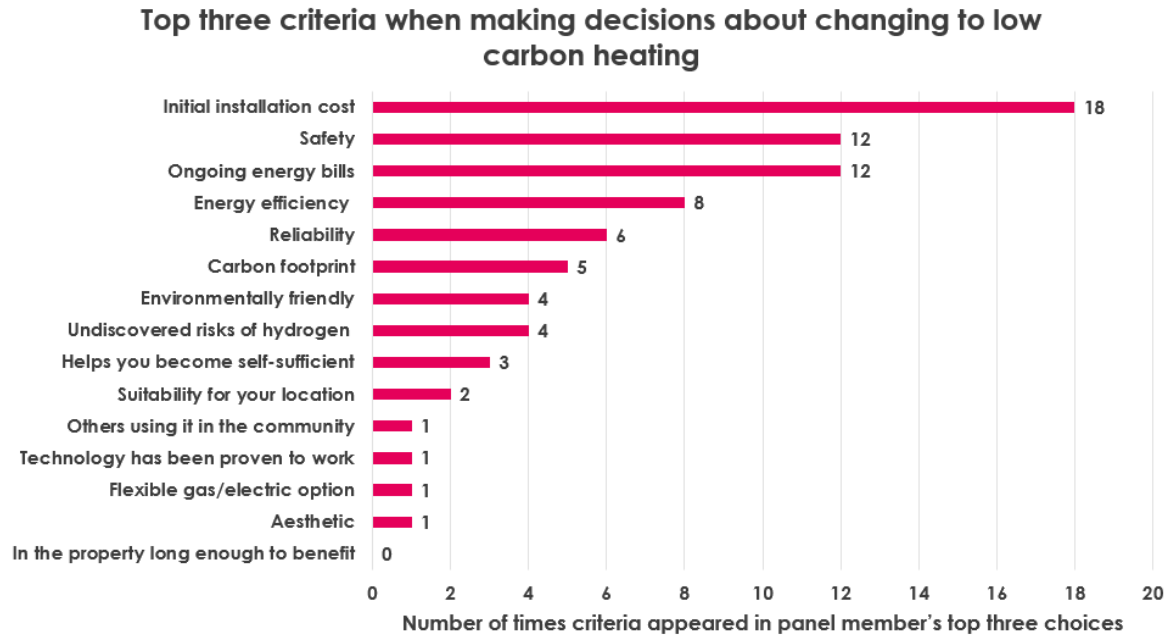


Figure 6, Recollective criteria task

1.3. What criteria would they base their decision on if they were not the decision-makers?

Most Panel Members agreed that **for non-decision makers such as renters, there would be less choice**, as landlords would make most decisions. However, many felt that landlords would be subject to minimum standards regarding energy efficiency, and that this would give renters peace of mind despite not having as much choice. Others felt that landlords of private rentals may not be held to the same standards as housing associations and councils. They thought this could lead to negative health implications for renters for example if heating systems were not updated.

"…with a housing association you know they've got standards, but in private renting…if they're not going to invest to change the heating over time, would it be that those systems could be quite damaging to people because they're not going to sell the parts to fix them anymore? So there could be people living in houses where the boilers are damaging to their health maybe?"

North Mid Wales Panel Member, workshop, week 2

Some Panel Members were also concerned that **the high costs of installation would be passed on to renters** who would be unlikely to benefit long term.

"…temporary accommodation, so concerns over whether or not to invest in low-carbon alternatives if the tenant won't gain the long-term cost benefits"

Mixed Panel Member, workshop, week 2

They also felt that the **type of energy would not factor into their decisions** when choosing a rental property. They were attracted by cheaper energy bills, but this would have to be weighed up with the other costs of moving.

"I don't think I would move, moving itself is costly. If it's working okay for the minute and you are managing, I would personally not move. I wouldn't just move because certain homes are cheaper, when I could afford it then I would move."

South Wales Panel Member, workshop, week 2

1.4. What barriers do participants think their local community would face to making changes to their homes?

When talking about barriers, Panel Members often referred back to the personas activity that supported them to think through people's differing circumstances. Members again felt that the **costs associated with installation were prohibitive**, especially against the backdrop of the soaring cost of living and stagnating wages. Panel Member's discussions about cost were largely framed around the **different implications for homeowners and renters.**

"There's always something more important, when you've got your own place, you know that the landlord isn't there to do everything…but with all these changes it's like where is that money going to come from? With two children a few grand to get a new boiler or put food on the table, the children come first."

North Mid Wales Panel Member, workshop, week 2

Many Panel Members felt that there should be **some form of financial support**. Some felt that putting off these changes might mean benefiting from financial incentives further down the line if they become available.

"I would wait until the very last minute because I'm going to have to save so much to change it all. I'm not going to get myself into debt now when I could wait and see if I can reduce the debt by waiting for investments and financial incentives or aid."

Mixed Panel Member, workshop, week 2

For renters, Panel Members felt that **lack of control was the biggest barrier**. Some felt that this could be detrimental for renters as they may lose out on the potential financial benefits of low carbon energy. **Panel Members were particularly worried about renters and people on low incomes**. They felt they had little control to make their situation better.

"He probably wouldn't have a say, it's down to the landlord. And if they're not on smart meters, they can run up debt on gas and electric. The landlords in my experience don't care…and they often host vulnerable adults. They don't know what's going on…It worries me things like that. How will they cope?"

Mixed Panel Member, workshop, week 2

"It's such an important part of life isn't it, keeping warm? You hear about people in poverty not being able to keep warm or feed themselves, those are the two main points. So how are those people meant to heat a home which is potentially going to be even more expensive? How are they meant to put those boilers in?"

North Mid Wales Panel Member, workshop, week 2

Panel Members also **worried about disruption to renters** but to a lesser extent. They felt that renters would have little control over when the work on their accommodation was done and where they would go if they needed to temporarily move out.

"He'd have no choice really, with the housing they'd give you a time and date and you'd have to get on with it…Well there's not many houses to rehouse people in, is there? If you were rehoused for the work to take place, they haven't got the housing."

North Mid Wales Panel Member, workshop, week 2

When thinking about their communities, **Panel Members were particularly worried about vulnerable groups such as the elderly**. They felt that a lack of knowledge and feelings of uncertainty could be higher in these groups and that change could be particularly stressful for them.

"Especially older people, they don't like change. If they are comfortable and she is managing, the changes would make her feel anxious. I get calls all the time to save and change energy and it does sound good, but do you want to go through the process of change? I have done it once before and made a huge mistake so its worrying to do it again."

South Wales Panel Member, workshop, week 2

Members felt that uncertainty might be linked with low carbon energy being seen as technologically advanced. They felt that the elderly may need special focus to support their understanding. A few felt that a lack of understanding around safety in particular could be a major barrier.

"Not to be too judgemental but at her (the persona of an elderly woman) age would she struggle to understand some of the technology and need more guidance to help her?"

South Wales Panel Member, workshop, week 2

Panel Members also felt that potential disruption to homes could be a barrier for the elderly as well as other vulnerable groups.

"My mother didn't like people coming in the house, the disruption of work men in the house. She was offered central heating etc and she just didn't want change or disruption. They need people to speak to them and hear them out, but also to explain properly that it is for their benefit."

South Wales Panel Member, workshop, week 2

When thinking about barriers **Panel Members questioned the level of personal responsibility and burden of change**. They felt that individuals are expected to carry the burden of supplier products that have harmed the environment and that the responsibility should lie with those suppliers.

"…we as consumers take it upon ourselves and feel like we've done all of the (environmental) damage, when it is actually the companies that have provided the services that are at fault…We have always been driven by what the supplier has said, for example electricity/gas/diesel cars/ being the way forward, but then it is down to us to pull together and make things better when companies aren't taking any responsibility. We are always the ones that have to pay for this."

Southwest England Panel Member, workshop, week 2

The graph (figure 7) below shows what barriers Panel Members felt their community had in transitioning to low carbon heat. The list of barriers in this activity were identified based on the discussions around barriers in workshop two. It shows the number of times each barrier was a top three choice. The top three results of financial situation, not being the homeowner/decision maker and concerns about disruption broadly reflects what panel members discussed in the workshops.

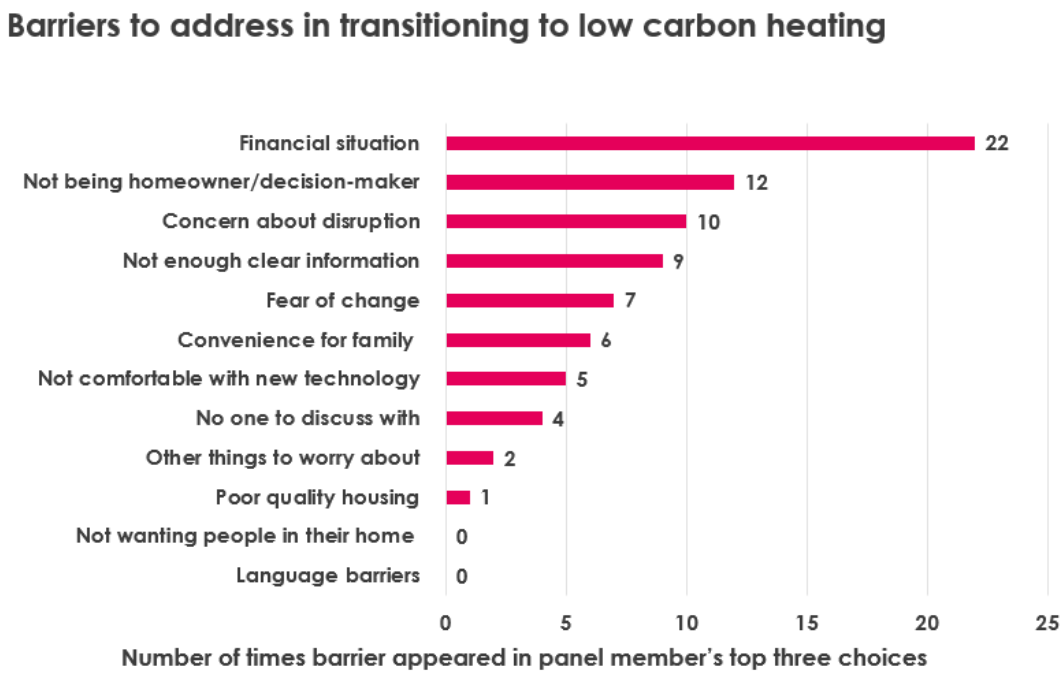


Figure 7 – Recollective barriers to low carbon heat task

1.5. What information would they want, how do they want to be engaged and who by?

What: Panel Members want to be informed of **financial costs and incentives** that relate to their circumstances and indicated that this would be essential for them to make an informed decision.

"Would I get help? I'm quite happy with gas. If they want me to change, is there financial help out there? ... I would certainly need someone to explain it a bit more for me and the running costs etc. To make an educated decision."

South Wales Panel Member, workshop, week 2

"Maybe it would be interesting to see pilot schemes implemented for different income ranges, then everyone else can gauge for themselves how it applies to them."

North Mid Wales Panel Member, workshop, week 2

Panel Members also wanted more **information on the importance of switching to low carbon technologies**. They wanted to know how different options support the environment.

How: In the workshops, Panel Members felt that there should be more information about decarbonising heat across multiple channels to build awareness. In discussions they felt that **social media and TV adverts** would be particularly good due to their large audiences.

"Social media like Facebook and Instagram, for example through adverts. There are so many adverts there and most people use social media."

South West England Panel Member, workshop, week 2

A few Members felt that their **energy bill** would be a good place for information, but others disagreed, worrying that some people might overlook it. On Recollective Panel Members voted **direct mail** as the best way to be contacted.

The chart below (figure 8) shows panel member's choices on Recollective. They rated direct mail as being the best way to engage the public, followed by face-to-face engagement and community groups.

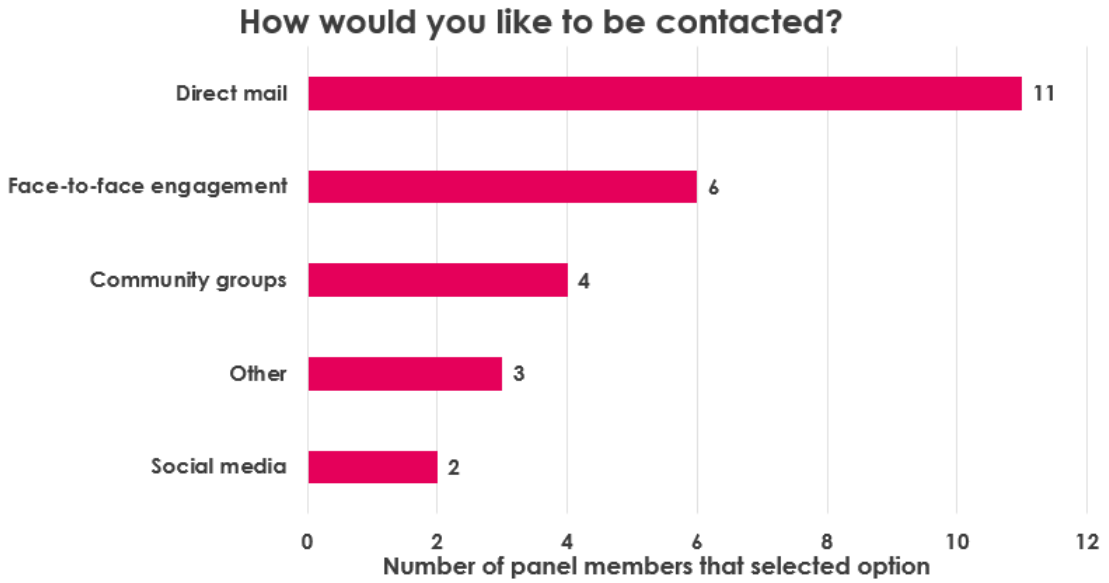


Figure 8 - Recollective contact preference task

Who: Distrust was a key factor in who Panel Members wanted to be engaged by. Many felt that sources such as a **gas suppliers or plumbers might not be impartial.**

"The trouble is where you get it from, for example plumbers or a gas company, it would likely not be impartial…Yeah, they might recommend based on how easy it is for them to install it."

South West England Panel Member, workshop, week 2

Some felt that government sources would also not be trustworthy, preferring to **conduct their own research** using organisations such as Which? for their reputation for impartiality. They felt that personal research was the safest approach.

"I would like to do my own research and then you'll be morally happy with your decision. You have to check multiple sources, for example reviews, and spend a lot of time on it. Very important if it is going to cost a lot."

South West England Panel Member, workshop, week 2

The graph below (figure 9) shows the amount of times each category was in a panel member's top three choices. Panel members chose their energy distribution network, energy supplier, local council, and the Government.

The difference in opinion is likely to be that the Recollective data represents who panel members think they should be hearing from. Whereas through conversation in workshops panel members were more able to be nuanced and express how they felt the reality might be.

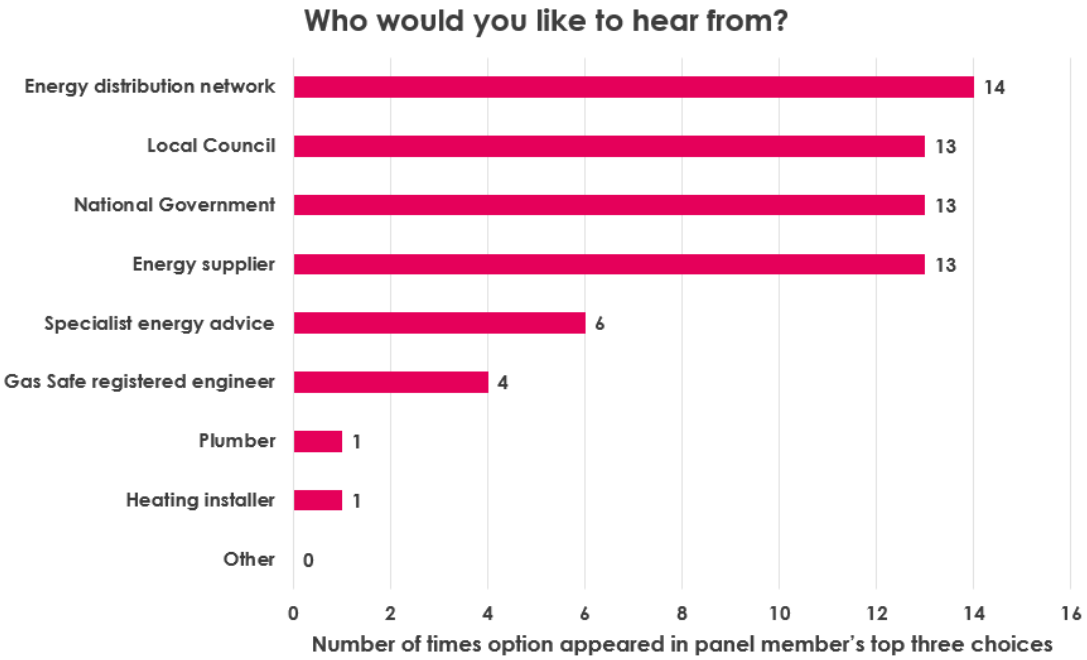


Figure 9 - Recollective preferred organisation to hear from task

1.6. How do Panel Members make decisions about major purchases?

1.6.1. How have they made choices in the recent past?

Cost was one of the biggest factors panel members took into account when making major purchases in their lives. They desired value for money in purchasing large items such as cars and electronic devices.

"Budget, it is the main factor for most of my purchases. Because it is quite small, it is quite limiting, so it is usually the deciding factor."

Southwest England Panel Member, workshop, week 3

As well as the cost, **personal research was very important to panel members**. Members described doing online research to determine the suitability of a product for their needs. Although this was a valuable process for many, some voiced doubt about the trustworthiness of online reviews. One member noted that sites like Which? can be a powerful influencer in decision making due to their marketing.

Many members asked people they knew for information on major purchases, including family, friends, and neighbours. Overall, they felt that **advice from people they could trust was more reliable than information available online**.

"Recommendations from family and friends - I'd take that over online reviews on the internet because they might be biased."

Southwest England Panel Member, workshop, week 3

Whilst most members described personal research as an important factor in decision making, there was discussion in the mixed group about making quick decisions. Some of these panel members described being under time pressure to make decisions or being overwhelmed by the amount of information about a certain product. In these cases, they felt that making quick decisions on what to buy had paid off for them.

Members also valued **reliability** when making major purchases. They wanted purchases to function well for a long time and appreciated good warranties. Reliability extended beyond the product to the brand itself; some members felt that they would prioritise a brand they trusted and would also look for good customer service and technical support with their purchase.

"I agree, if you trust a brand you'd definitely go with that. If they've done well for you and your family in the past, you're more likely to stick with that."

Southwest England Panel Member, workshop, week 3

1.6.2. What would they base their decisions around purchasing/using an electric vehicle on?

When thinking about purchasing an electric vehicle, **cost** was again a major concern for panel members. This included the cost of the vehicle itself, unit cost of electricity and any ongoing maintenance costs.

"I am looking for a new car as well and I know the way forward is electric cars, but the price is quite high and then with electric going up as well, I'm torn really with what to do."

North & Mid Wales Panel Member, workshop, week 3

Many panel members were concerned about the **suitability** of electric cars for their lifestyles and **lacked trust in the technology and infrastructure**. They worried about the availability of charging points and the number of miles an electric vehicle could travel; for some, the distance you could travel between charges was too short to be convenient. This was of particular concern for a panel member who drives a lot for their job. Some members also felt they would need to be well organised to remember to charge the car frequently, meaning it could be a hassle for them.

"For me it's the distances I cover, I might have gotten a hybrid which might work for me…I want to do my best and reduce my carbon footprint but it's got to be sensible for me and my job too."

South Wales Panel Member, workshop, week 3

1.6.3. What would they base their decisions around purchasing domestic heat technology on?

For the final part of this activity, panel members were asked to consider how they would make decisions about purchasing domestic heat technologies. **Members perceived low carbon heating systems, particularly heat pumps, to be expensive to install**. This would affect their decision making as they may not be able to field the upfront cost. However, if the cost of a hydrogen boiler was similar to a gas boiler, then panel members were more willing to consider this as an alternative.

"Cost. We've been told that the hydrogen boiler is going to be a similar price to the gas boiler - then naturally I'd look at that as an alternative."

Southwest England panel member, workshop, week 3

Many panel members felt they were **lacking the information necessary to decide on purchasing a low carbon heating system**. They had little to no awareness of options such as hydrogen prior to participating in the panel and remained unsure about the specific details of different technologies. Lack of information also encompassed a feeling that members would not know where to get technical support for their purchases, either.

"If you were getting your car fixed you'd go to someone you'd trust, but how do we know who can fix and maintain these boilers as it's starting out?"

North & Mid Wales panel member, workshop, week 3

Panel members were receptive to the idea of a government funded 'one stop shop' presented by a speaker from the Energy Saving Trust during workshop 3. This would be a central location to provide information and advice on low carbon heating options; panel members felt reassured by the potential of speaking to professionals and having their questions answered directly.

Other factors mentioned included:

- Lack of options in rural areas
- A wish to avoid disruption to their household

2. How comfortable would Panel Members be using hydrogen for domestic heating (heating, hot water, cooking)?

Snapshot summary findings

- Cost, and the lack of clarity around future costs, which were key concerns Members had around the home heat transition (see Findings chapter 1.1), also applied to hydrogen.
- Similarly to the scepticism over the environmental credentials of new low-carbon technologies generally, Members were worried about spending on hydrogen technology which may in turn become obsolete.
- Panel Members also raised specific concerns related to the scalability and safety of hydrogen.
- While concerns around cost remained for hydrogen, Members liked the fact that installation costs would be lower than alternatives, particularly heat pumps.
- They were generally open to being in a hydrogen trial (the mixed location group was particularly positive and liked the idea of being a pioneer) although they felt the risk of being in a trial warranted some form of incentivisation to take part.

Overall Panel Members were comfortable with the idea of using hydrogen in their home (see Appendix 3 for level of comfortable towards hydrogen when polled), however this was caveated by several concerns.

Members' key concern, raised early in the process was around the **overall cost of the 'whole process' of hydrogen** – from the price as an energy source to installations and wider costs. This was also a general anxiety around the transition to net zero and low carbon heat (see Findings chapter 1.1).

"I would say biggest concern would probably be more than anything price. The price of hydrogen, the whole process of going from the switchover, to the installation"

Mid-north Wales Panel Member, workshop, week 3

Their concern about the whole cost of hydrogen, was also driven by a **lack of clarity around hydrogen's future costs**. Citing recent, sharp increases in energy prices, some Members were concerned that they would invest money now (such as in a hydrogen ready boiler), partly in the hope of saving money, but that any savings would be swallowed up by increasing energy prices in future.

Other Members had similar concerns, but specifically focussed on technology – that they would a invest a significant amount of money in a hydrogen boiler, only for it to either get a lot cheaper, or become obsolete – or both.

"This reminds me of when we had video players, then DVD players came out, and they started off really expensive (like 500 pounds) until everyone was using them. Pretty quickly technology developed again and now they barely exist."

Southwest England Panel Member, workshop, week 3

Members concerns around the cost of hydrogen were similar to the concerns about home heat decarbonisation generally. They did, however, raise some concerns specific to hydrogen – particularly driven by presentations in week 3 on major consumer purchases (Energy Savings Trust) and a more detailed look at hydrogen (Wales & West Utilities).

While the **scalability of hydrogen** had been highlighted to Panel Members, the presentation by Energy Savings Trust at the final workshop prompted many to question whether hydrogen could deliver on a significant scale.

"I'm worried about there being enough hydrogen, like what that expert said about there not being enough to heat all the homes."

Southwest England Panel Member, mixed group, workshop, week 3

Several Members, particularly those in mid-North Wales, were additionally concerned about **regional disparity and fairness**, with hydrogen best suited to urban, heavily industrialised areas. Some of these Members hoped that hydrogen would provide a cheaper form of energy than other low/no carbon options and so felt it was unfair that people living in rural areas would miss out on this.

"The thing is we live in Mid Wales and it's got nothing, it's all light industry, its farming so to us it would be expensive because we've got nothing near."

Mid-north Wales Panel Member, workshop, week 3

Some Members wanted reassurance that **hydrogen would be safe** before they would be open to having a hydrogen boiler in their home. This began in the early stages of the Panel, with a few Panel Members expressing concern that hydrogen was reactive, could leak and cause an explosion.

While concerns with the safety of hydrogen were less common later in the process, some Members remained cautious – needing reassurance on some of their key concerns before they would take part in a trial. While they did not specify who they would want this reassurance from, some Members felt they, and the wider general public, have a level of trust in companies like Wales & West Utilities to safely deliver a reliable supply of energy (see Findings chapter 3).

"[My hope is] That its cheaper, carbon free or carbon neutral so it doesn't negatively affect the environment. And also that it doesn't blow you up."

Southwest England Panel Member, workshop, week 3

Panel Members felt there were some key consumer benefits that hydrogen had to offer, particularly in relation to some of the other low carbon heat options available.

While there was concern about the lack of clarity on operating costs of hydrogen, many Members felt that the **lower installation costs and lower levels of disruption, particularly in relation to heat pumps**, could make it an attractive and accessible

option for many. They also liked the fact a 20% blend could be introduced and have an immediate impact on lowering carbon emissions.

"It said it would reduce it by however many million tonnes and that would be equivalent to taking 1.5 million cars of the road. Even if it isn't massive, it is still positive."

Southwest England Panel Member, workshop, week 3

When discussing whether they would join a trial for hydrogen, the majority of Members were positive about the idea, particularly if there was some kind of reward or incentive to take part.

"Are they paying for the boiler? If they pay for it no problem, I wouldn't mind the disruption."

Southwest England Panel Member, workshop, week 3

When discussing whether they would want to be a 'pioneer', some Members felt more **risk-averse** and wary of taking part in a trial – whether due to safety concerns (characterised by one Panel Member as being a 'dummy' for a trial), the likely disruption or just due to a fear of the unknown. There was an acknowledgement across all groups that there was a risk involved in taking part in a trial, leading to an assumption that taking part would be incentivised – typically with a free appliance, free installation, or both.

In the mixed location group, however, almost all Members liked the idea of being a pioneer or a trailblazer in being one of the first people in the UK to trial a hydrogen boiler.

"Yeah [I'd be excited to] be a trailblazer!"

Southwest England Panel Member, mixed group, workshop, week 3

3. What it means for Wales & West Utilities

Snapshot summary findings

- Panel Members felt Wales & West Utilities has a key role in supporting customers in the transition to low or no carbon heat.
- They saw trust as underpinning two key roles WWU could:
  - Deliver reliable infrastructure while minimising consumer disruption.
  - Raise awareness of the need for change and WWU's role in the change.
- They also felt it represented an opportunity to collaborate with other organisations and stakeholders who will have a lot of engagement with citizens on this issue.

Panel Members felt that there was a low level of public awareness of the transition to low and no carbon heating. They felt the scale of the challenge and the accompanying impact and disruption to people's lives could come as a shock. Members generally saw a key role for Wales & West Utilities (WWU) in supporting people (both as citizens and as consumers) in this transition.

"They need to be able to facilitate the change, which they said they were working on. Just by doing things like this they are taking a big role."

Southwest England Panel Member, workshop, week 3

Members identified trust as a crucial factor in two key roles WWU could have. Firstly, the public in Wales and Southwest England would need to trust WWU to continue delivering reliable infrastructure, minimising consumer disruption as much as possible. Some Members felt that WWU were in a strong position here as they have a track record of delivering strategically planned upgrades and are experienced in managing disruptive changes (such as digging up roads and replacing pipes).

"We trust people every day, we trust the same energy companies and Wales and West, so really, we're keeping our trust in the same people to pipe it in."

South Wales Panel Member, mixed group, workshop, week 3

Some Panel Members in the mixed location group went further by suggesting an opt out system and trusting WWU to take the lead in decarbonising home heat. They referenced similar changes to workplace pensions or organ donation that people now have to opt-out from.

"It should be your pipes are being changed unless you want to stay with natural gas, and that you'll have to pay for the transition when natural gas runs out."

Mid-North Wales Panel Member, mixed group, workshop, week 3

While this suggestion prompted some discussion around who the responsibility should sit with and whether this approach gave the public enough choice, it was agreed by

all that it would need a strong campaign to raise awareness of the transition to low or no carbon heat, with examples including the FCA's PPI deadline campaign.

The second area where trust was seen as crucial was in this public awareness piece. Members felt there were two key areas where public awareness needed to be raised:

- Awareness of Wales & West Utilities. Members wanted to see WWU play an active role in the low carbon transition but recognised that for people to trust them as an organisation, more people need to know who they are.
- Why we need to change our gas. Panel Members saw making the case for why a consumer change of this scale is needed as vital to secure public support for the changes.

In both cases, ensuring transparency and accessibility would be the basis for building trust.

Finally, Panel Members saw a real opportunity for Wales & West Utilities to collaborate with other organisations who will have a key role in the transition. Alongside other big organisations in the public and private sector, plumbers and those installing and repairing boilers could play a vital role since they have a lot of customer interaction as well as trusted relationships with those customers.

"The suppliers are the people that you interact with but they have to get it from somewhere. The information has to trickle down, you want your plumber to know about it if they will be doing the work."

Southwest England Panel Member, workshop, week 3

4. What materials do Panel Members find clear and accessible, and what do they struggle to understand, or think is unclear?

Snapshot summary findings

- Panel Members generally felt materials were easy to understand, with visual aids particularly helpful – from videos to a bathtub analogy to explain net zero.

4.1. Feedback and suggestions on materials

Overall, panel members felt the **materials provided throughout the programme of engagement were easy to understand**. This included both the workshop materials and information and activities available on Recollective. Members also ranked the materials and process highly in the week 1 and 3 Recollective feedback activities (see Appendix 1).

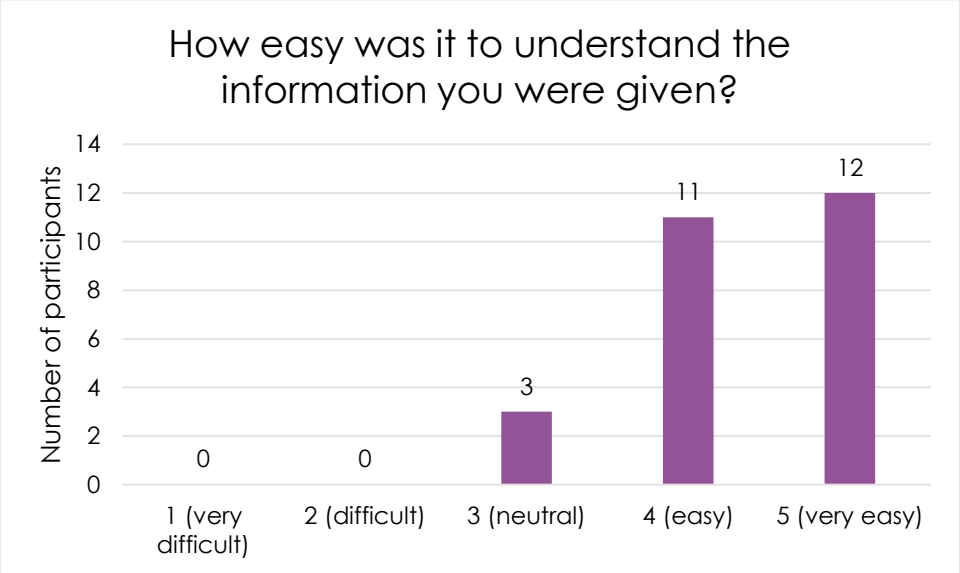


Figure 10 - Understanding the information

"I think that most of the general presentation, the slideshow, visual aids, and the commenting etc., were quite easy to understand"

Southwest England Panel Member, workshop, week 3

Whilst members generally felt content was easy to follow, some expressed concern that workshop presentations delivered a lot of information at a fast pace. These members found it difficult to listen to the speaker whilst also being able to read the presentation slides and keep track of questions in the Zoom chat. **They felt they would have benefitted from more time to deliberate on the information being given**.

"It was a lot of information in a short amount of time, it was really interesting and I wanted to hear more just hard to take it all in a short amount of time"

Mixed group panel member, Recollective, week 1

When it came to information mediums used, some panel members praised the use of **visual aids** such as the explanatory videos included in workshop 1 and on Recollective. They appreciated being 'shown' information as this helped them better understand the topics being discussed. However, some panel members in the Southwest England group did not like the Which? video on hydrogen as they found it unclear.

"I liked the video of the bathtub – sometimes reading vocab you have never seen before can be difficult, but the bathtub helped explain a lot. Me personally I would learn more with pictures and videos like that. If I hadn't watched them there would be a lot of stuff I wouldn't understand."

South Wales panel member, workshop, week 1

Where suggestions were given on how to improve the materials, these included:

- Ensuring there are subtitles for any videos included in the panel
- Using more visuals to illustrate the topics being discussed

For the final online activity, panel members were asked if they had any feedback or suggestions on the engagement process. Most panel members were positive about the experience and expressed interest in being involved in future panel opportunities. **They felt the panel was informative, well organised, and some particularly praised the facilitators for ensuring that all members voices were heard in breakout rooms.**

Where Panel Members noted specific suggestions for the panel moving forward, these included:

- More time for panel members to ask questions to the experts
- Circulating workshop content beforehand so members can read ahead
- Automatically placing all Panel Members on mute after introductions to ensure no accidental disruptions
- Not holding panel sessions during the school holidays (half term)

4.2. Topics that panel members struggled to understand

As panel members moved through the programme of engagement, they were given opportunities to ask questions to aid their learning. Whilst most felt that by the end of the deliberation they had a clearer grasp of the content, during the process there were a few key themes that caused some confusion amongst members. These are detailed below.

Cost was the most common topic that panel members sought clarification on. This included further information on the installation and running costs of low carbon heating sources, likely a heightened concern against the backdrop of the current

energy crisis. Some panel members also desired more information on available grants, particularly for middle income people who may not be officially classed as fuel poor.

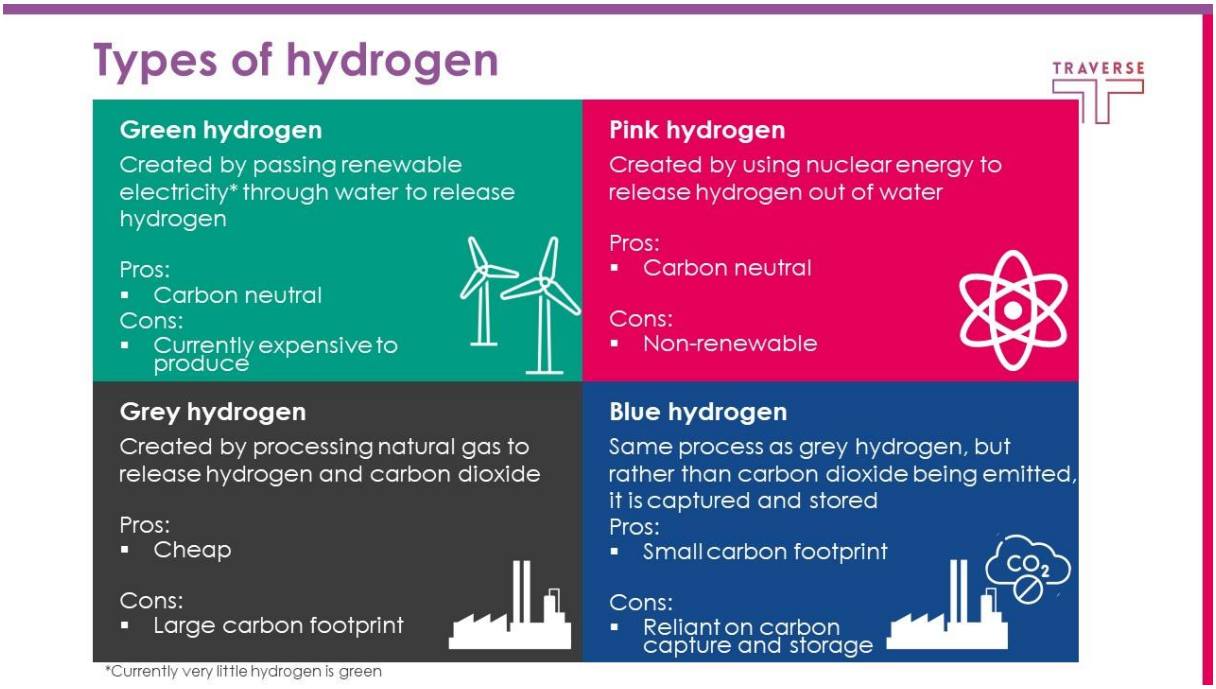
"I really want more breakdown on costs – I don't know if they can go into that detail or if we are at that stage yet. If it's got to be done it's got to be done, but I would like some warning so that we know in advance if we need to save etc."

South Wales Panel Member, workshop, week 1

A particular source of confusion for many panel members was the **process of how hydrogen is produced**. Many members expressed confusion about the different colours of hydrogen which prompted the Traverse team to create an explanatory graphic which was uploaded to the Recollective platform after workshop 1 (see below).

"I found the different colours of hydrogen not very easy to understand, that could've been gone over a bit more."

Southwest England panel member, workshop, week 1



Other themes that panel members required more information on at the start of the programme of engagement included:

- Detail on the nationwide switchover process, including how hydrogen will be introduced to the network and how information will be made available to people
- Further clarification on the safety of using hydrogen as a fuel source

Conclusions

Panel Members understood the need to transition to low carbon home heating but remained worried about cost.

While cost is often an issue for citizens when deliberating on new technology, products and wider investment, this was amplified by the energy price crisis and planned increase in the energy price cap in April 2022. This is evidenced by Members referencing it regularly during the workshops and on Recollective and became a key criterion on which they judge low carbon home heat options.

Some Members found hydrogen's lower installation costs and ability to reduce carbon emissions, particularly in relation to natural gas, made it an attractive option to get low carbon heating at home.

Members' anxiety around the uncertainty (particularly in relation to cost) of low carbon heating options extended to hydrogen. Some were worried that running or operating costs would increase significantly in future, often citing recent energy price increases, and felt that the lack of clarity on this made it difficult for them to compare different low carbon heating options. Others focussed on the investment required for new low carbon heat technology – and while a hydrogen boiler would be cheaper than other options, like heat pumps, they were concerned it would soon become redundant and need to be replaced with a new technology.

Panel Members agreed that a significant consumer change was coming, and that people will need help and support navigating it. While citizens will need to be engaged and consulted, they felt public awareness needed to be substantially raised first. For this to be successful, it needs to be both accessible (can I, as a citizen, understand it?) and transparent (can I, as a citizen, trust that they are telling me what I need to know?).

Appendix

1. Feedback

1.1. Recollective feedback week 1

Citizen panel member	On a scale of 1-10, how easy to understand have you found the information that you've been presented with so far?: workshop materials	On a scale of 1-10, how easy to understand have you found the following information?: Pre-task video about net-zero	On a scale of 1-10, how easy to understand have you found the following information?: Workshop 1 presentation from committee on climate change speaker	On a scale of 1-10, how easy to understand have you found the following information?: Video from 'Which?' about hydrogen heating	On a scale of 1-10, how easy to understand have you found the following information?: Workshop 1 presentation from Wales & West speaker about gas options
Member 1	9	9	6	9	9
Member 2	9	9	9	9	9
Member 3	9	10	9	9	10
Member 4	7	8	8	8	7
Member 5	9	9	9	9	9
Member 6	9	9	9	9	8
Member 7	10	10	10	9	7
Member 8	10	10	10	10	10

Member 9	10	9	9	9	9
Member 10	10	10	10	10	10
Member 11	7	9	6	8	6
Member 12	10	10	10	10	10
Member 13	9	10	10	9	9
Member 14	9	10	10	10	10
Member 15	8	10	8	10	8
Member 16	5	7	5	8	7
Member 17	9	8	9	8	8
Member 18	10	8	10	10	9
Member 19	4	9	8	7	7
Member 20	6	5	7	7	8
Member 21	9	10	10	9	9
Member 22	9	9	9	9	9
Member 23	8	9	8	7	7

Member 24	5	10	7	2	7
Member 25	7	9	6	4	8
Member 26	9	10	9	10	9

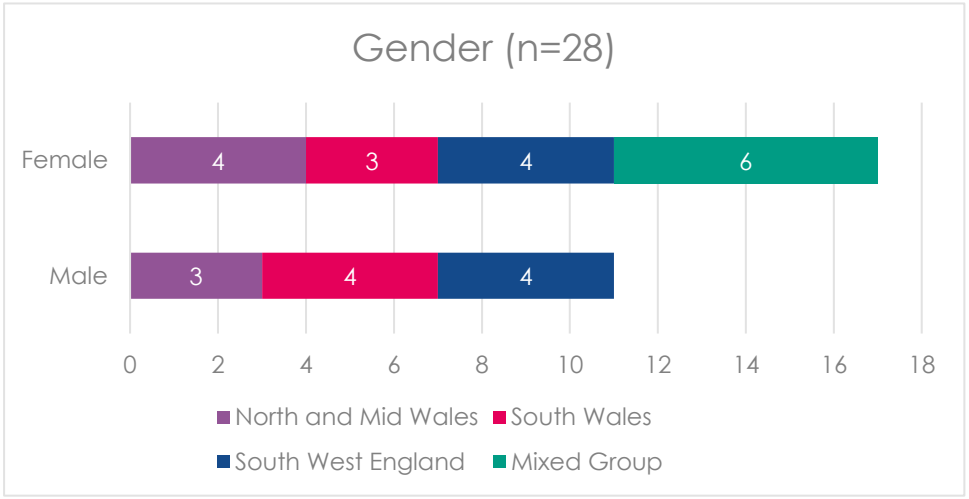
1.2. Recollective feedback week 3

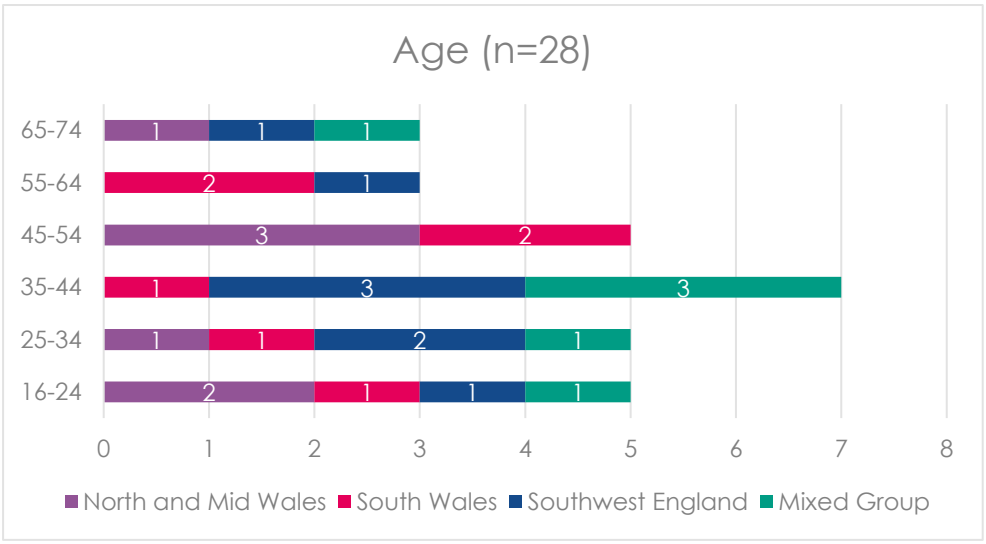
Citizen panel member	On a scale of 1-5, how was your overall experience of the Citizens Panel?	On a scale of 1-5, how easy was it to understand the information you were given?	On a scale of 1-5, how easy was it to share your views in the workshops?	On a scale of 1-5, were you satisfied with how your questions were answered?	On a scale of 1-5, how well do you understand the concept of Net Zero?
Member 1	4	4	5	5	5
Member 2	5	5	5	4	4
Member 3	5	5	5	5	5
Member 4	5	4	5	5	5
Member 5	5	5	5	4	4
Member 6	5	4	5	5	4
Member 7	5	5	5	5	5
Member 8	5	5	5	5	5
Member 9	4	4	4	4	4

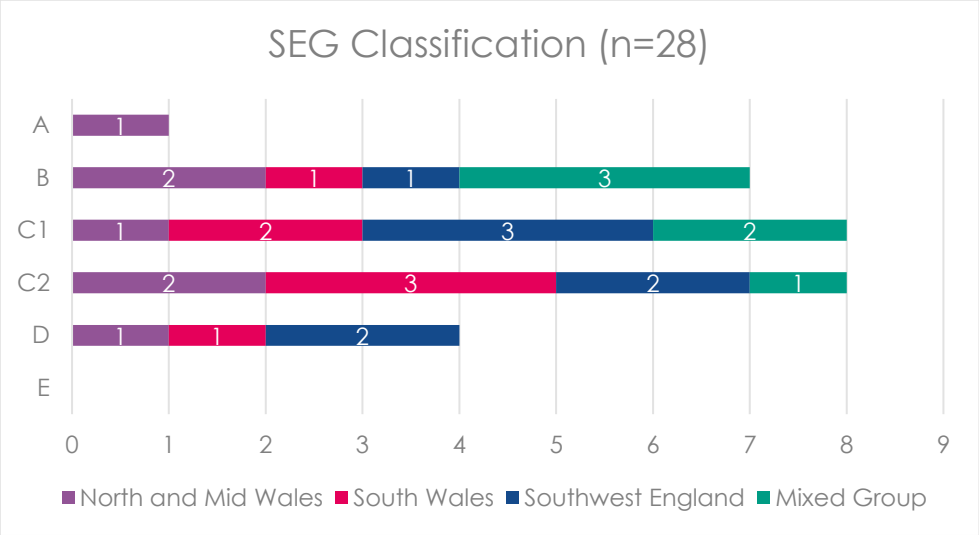
Member 10	5	5	3	3	5
Member 11	4	4	4	4	3
Member 12	5	5	5	5	5
Member 13	5	4	5	5	4
Member 14	5	5	5	5	5
Member 15	5	4	5	5	5
Member 16	3	3	5	4	3
Member 17	5	4	5	4	5
Member 18	4	4	5	5	4
Member 19	3	3	5	4	3
Member 20	4	3	4	5	3
Member 21	5	5	5	5	5
Member 22	4	4	5	5	5
Member 23	5	4	4	3	3
Member 24	5	5	5	5	4

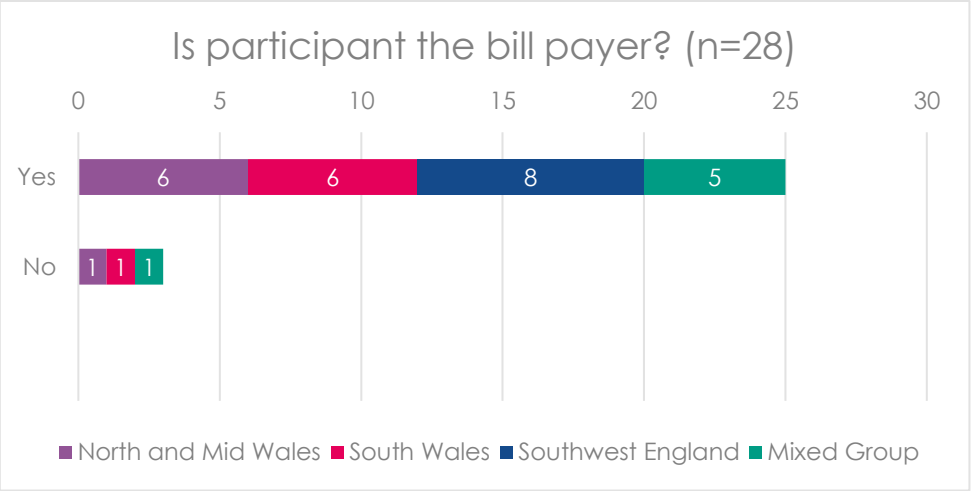
Member 25	5	5	5	5	5
Member 26	5	5	5	5	5

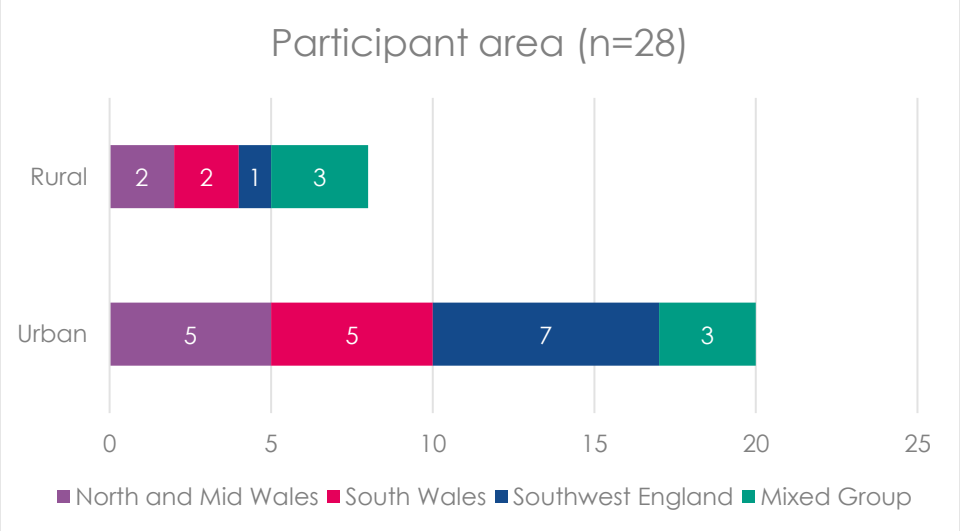
2. Recruitment data

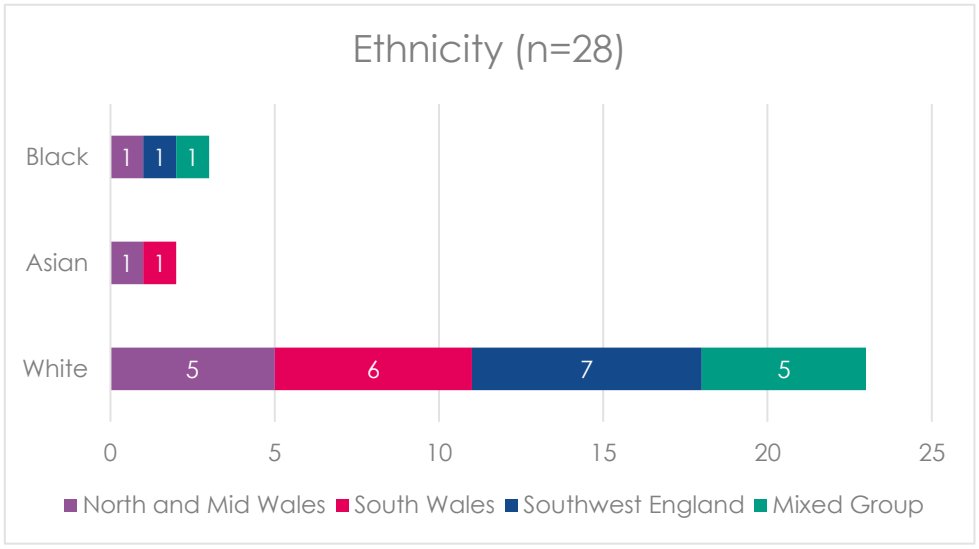





SEG Classification (n=28)
A
B
C1
C2
D
E
1
2 1 1 3
1 2 3 2
2 3 2 1
1 1 2
0 1 2 3 4 5 6 7 8 9
North and Mid Wales
South Wales
Southwest England
Mixed Group


Is participant the bill payer? (n=28)
0 5 10 15 20 25 30
Yes
No
6 6 8 5
1 1 1
North and Mid Wales
South Wales
Southwest England
Mixed Group


Participant area (n=28)
Rural
Urban
2 2 1 3
5 5 7 3
0 5 10 15 20 25
North and Mid Wales
South Wales
Southwest England
Mixed Group



3. Hydrogen tracker data

Panel members were asked at five key points in the programme of engagement how comfortable they felt towards hydrogen. At the start of the project, before any of the workshops had taken place, a majority of the Panel felt comfortable or very comfortable with hydrogen – based on what had been discussed at the Panel's trial a year earlier. As Members learned about net zero and hydrogen in the first workshop (in the information giving phase), they felt less comfortable with hydrogen in their home. As they deliberated and reflected on low carbon heat and hydrogen, this reversed, and the trend (outlined below) broadly continued until the end of the project.

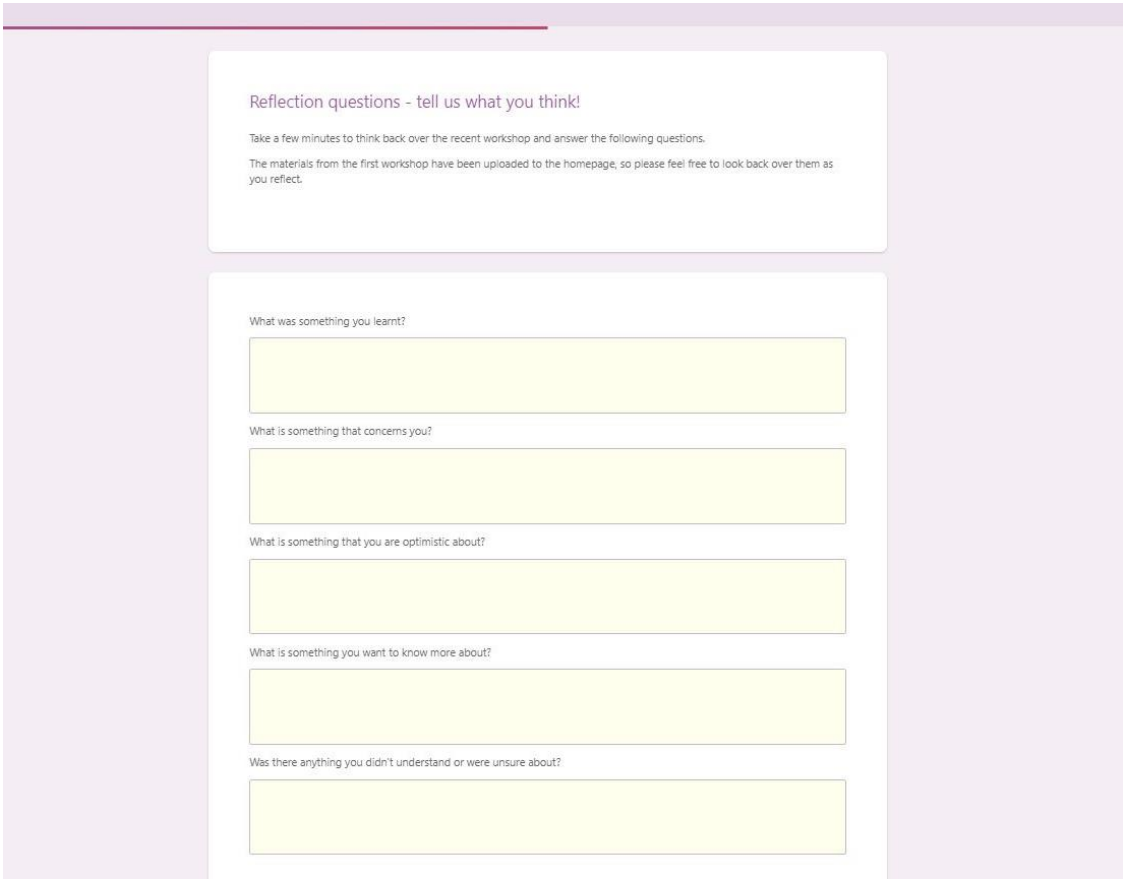
- The number of Members who felt comfortable or very comfortable with hydrogen increased.
- The number of Members who felt uncomfortable or very uncomfortable fell, although not by the same rate.
- The number of Members who were undecided (choosing Neither comfortable nor uncomfortable or Don't know) dropped – with the week 2 workshop (where Members deliberated on criteria and barriers to engagement) the turning point.

	Very comfortable	Comfortable	Neither comfortable or uncomfortable	Uncomfortable	Very uncomfortable	Don't know
Recollective 1	5	10	8	2	0	1
Workshop 1	3	8	8	4	0	2
Workshop 2	4	8	7	0	1	1

Workshop 3	8	9	4	1	1	0
Recollective 2	7	13	5	0	1	0

4. Sample of materials used

4.1. Week 1 – Reflection questions (Recollective)



4.2. Week 2 – Sample personas (workshop)

Priya

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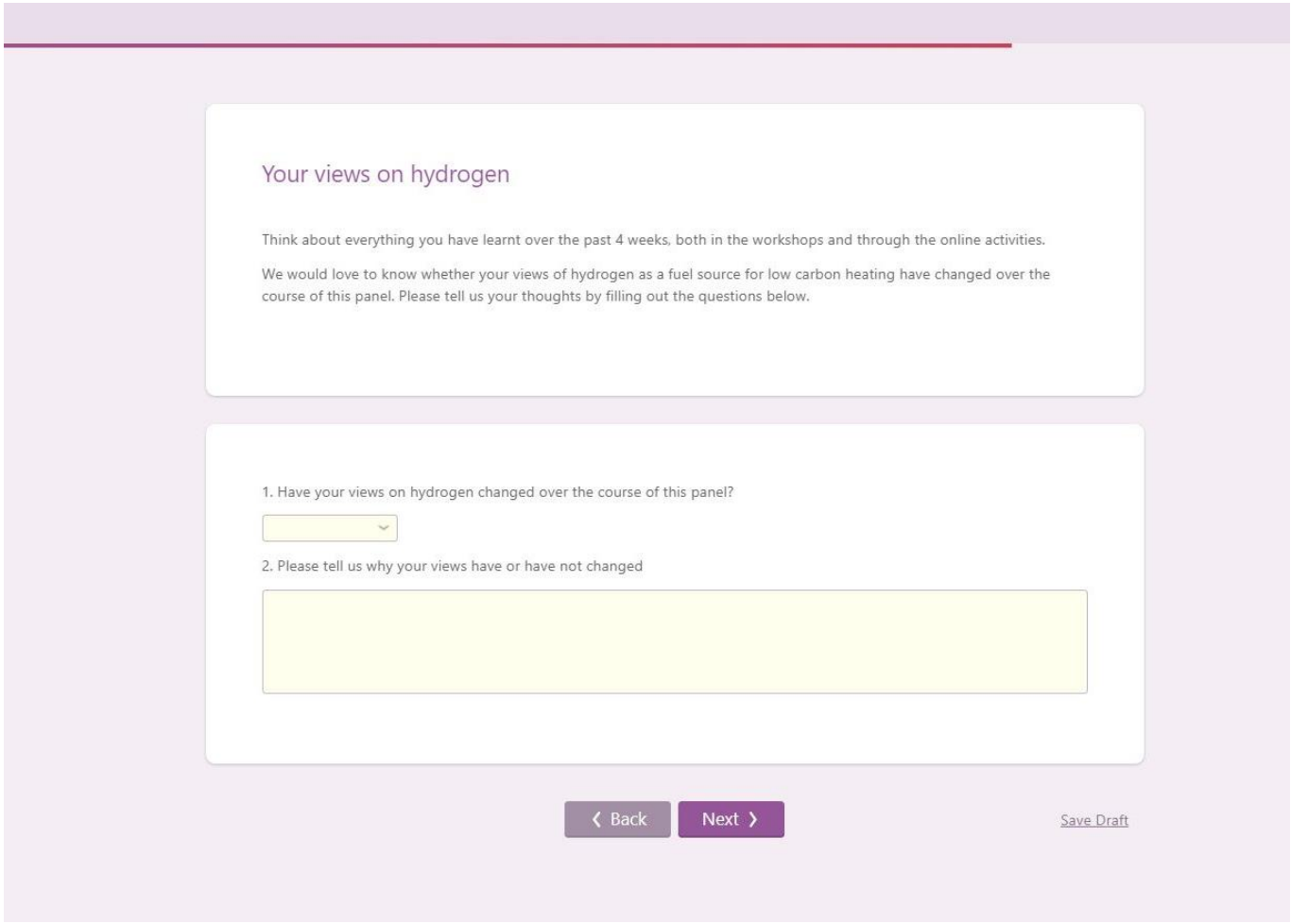
- Priya is recently widowed.
- She speaks English but sometimes finds communicating challenging.
- She lives in a small semi-detached house.

Julia & Russell

- Julia and Russell are married with a son, Michael.
- They just about make ends meet each month, but have little to no money for savings or much else outside bills and rent.
- They have a small but poorly insulated home.

4.3. Week 3 – Views on hydrogen (Recollective



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