

Heat in Buildings Strategy

Analysis of responses to the consultation

September 2021

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Summary

Introduction

This summary sets out key themes from the analysis of responses to a public consultation on the draft Heat in Buildings Strategy.

The draft Heat in Buildings Strategy brings together the Scottish Government's ambitions on energy efficiency and heat decarbonisation into a single framework. The draft Strategy covers the long-term vision and near term action needed to decarbonise Scotland's building stock in a way that ensures a just and fair transition and continues to tackle fuel poverty. It has been published as a draft for consultation, with feedback used to inform a final Strategy document in due course.

The consultation opened on 5 February 2021 and closed on 30 April 2021 and asked 70 questions. In total, 178 respondents made a submission, and breakdown of the number of responses received by respondent type is set out below.

Respondents by type	Total
Academic Group or Research Centre	8
Community Council, Trust or Group	6
Consultancy, Training, Assessment or Accreditation	13
Consumer Advice, Advocacy or Campaigning	8
Energy Generation, Supply or Distribution	20
Housing Association	9
Individual or Tenant Group	15
Local Authority	23
Product Manufacturer, Supplier or Installer	19
Professional or Representative Body (Energy)	15
Professional or Representative Body (Other)	21
Public Body	7
Third Sector or Non-Governmental Organisation	14
All respondents	178

The main analysis sets out a question-by-question analysis. This summary focuses on a number of recurring themes to emerge across the analysis at those individual questions.

Overall views on the strategic direction

Overall, a number of respondents from across a range of respondent types welcomed the publication of the draft Heat in Buildings Strategy, with some seeing it as representing a significant step forward in addressing the challenge of eliminating carbon emissions from buildings. The pathway to net zero heat set out was described as ambitious and as providing clear steps and targets against which

the Government can be held to account. Respondents also stressed the importance of creating a clear sense of direction, including to give industry the certainty it needs to invest in the development of supply chains, training, and production.

However, respondents also identified a number of significant challenges that will need to be overcome if the transition to low/zero emissions heat is to be successful. These included the necessary technologies being accessible and affordable at the scale required and within the timescales necessary to meet Scotland's net-zero targets.

There was an associated concern that it will be important to gain and retain consumer confidence in the new technologies, but that this could be jeopardised if early adopters experience problems in terms of reliability and/or cost, both in terms of capital and running costs. A concern was that there could be a substantial and sustained consumer backlash against one or more low/zero emissions heating technologies – it was suggested that previous attempts to stimulate a rapid expansion in the market for energy efficiency and low/zero emissions technologies hold important lessons for the Scottish Government, with the UK Government's Green Deal (2012-2015) cited as an example.

A number of respondents commented that they were broadly supportive of the assessment of strategic technologies to 2030 and agreed that the immediate focus should be on low and no regrets interventions. Further comments included that it is sensible to focus on those technological solutions for which cost uncertainty is low and the installation and running costs are well understood. Another perspective was that a heating technology agnostic approach should be followed as far as practicable and whilst options develop.

Comments on specific technologies were often extensive, and sometimes either advocated for a specific technology or raised concerns about the use of, or over reliance on, a specific technology. For example, comments addressed perceived advantages and disadvantages of heat pumps, both for on-gas grid and off-gas grid properties, along with the role of hydrogen, biofuels and a range of other technologies. There were also comments on the potential of, or need for, hybrid heat pump approaches and on the role and importance of heat networks.

Fuel poverty and affordability

There was a broad consensus around the importance of ensuring that the transition to zero emissions is just and will not have an adverse impact on those in, or at risk of, fuel poverty. Many of the other themes raised, and covered further below, were linked to the financial impact of the transition to net zero on consumers.

It was thought that heating costs are likely to rise for some consumers once they have low/zero emissions heating and that the cost of installing and running low or zero emissions heat systems could tip some households at the margins of affordability into financial stress. There were calls for the upcoming Fuel Poverty Strategy to offer clarity on how a detrimental impact on fuel poverty will be avoided in practice with the importance of ensuring that the decisions relating to the transition consider, and are contingent on, the extent of current and future levels of fuel poverty, extreme fuel poverty and vulnerability, stressed.

In relation to energy supply, there were concerns about the loss of access to currently cheaper fuel types or tariffs, and especially mains gas. With the majority of homes in Scotland currently reliant on gas, it was suggested that the deployment of electrical zero emissions heating systems at the rate required to meet the net zero target could result in cost increases unless other mitigating measures or wider reforms are implemented. In relation to any rebalancing of electricity and gas costs, it was suggested that the timing of any increases in gas costs would be critical and would need to coincide with significant progress in the roll out of electrical based heating systems.

Also in terms of mitigation of risk, and from a systemic perspective, it was reported that the financial commitment needed to avoid loading costs onto users will be very substantial; there was a concern that the current funding commitments are insufficient, that private sector investment will need to cover much of the early stage capital investment, and that commercial suppliers will pass these costs on to customers.

In terms of the households that may be most vulnerable to price rises, it was suggested that:

- The combination of being off-gas grid and living in a hard-to-treat property presents risks around increased fuel poverty. The phasing out of relatively and currently cheap fossil fuel heating options, such as heating oil, is likely to have a particular impact on those living off-gas grid.
- There could be challenges for those on restricted tariffs/prepayment meters, especially during periods of cold weather when they could see a sharp spike in immediately payable costs.

It was also noted that the risks are associated not only with fuel costs but also with capital costs. Specifically, it was suggested that homeowners already living in fuel poverty could be further marginalised due to the higher financial burden of improving the energy efficiency of aged homes and buildings. In terms of other groups of people, or types of household that might be easily overlooked but at risk of fuel poverty, here was reference to:

- Those experiencing in-work poverty.
- Households just below the radar of interventions that are firmly targeted on those already clearly in fuel poverty.
- Tenants living in rented accommodation, including in the social rented sector, if the cost of measures leads to increased rent levels, with the risk of fuel poverty being replaced with rent poverty.

There were calls for fuel poverty mitigation schemes to be designed to maximise the proportion of those in need who are reached. It was noted that some schemes, including the Winter Fuel Payment and the Cold Weather Payment, are in the process of being devolved and this was seen as presenting an opportunity to make sure they are designed to better target households experiencing fuel poverty.

It was also suggested that any heat target should be an outcomes-based standard which allows clear, measurable progress to be demonstrated and which includes a

benchmark to assess both progress to achieving net zero and reducing or eliminating fuel poverty. It was seen as important to understand the intrinsic link between fuel poverty and heating, and then consider its implications when designing a new heat target, but also when considering how it will be delivered and how progress will be assessed.

In addition to fuel poverty-related comments, there was also a more general focus on affordability, including around the importance of continuing to work with the UK Government regarding how policy costs are transferred onto energy prices. There was reference to the UK's Sixth Carbon Budget and its call for a rebalancing of gas and electricity prices, with further comments including that policy costs should be removed from domestic electricity bills.

Challenges for island and other remote communities

As noted above, there were concerns about the impact that the combination of being off-gas grid and living in a hard-to-treat property presents in terms of increased fuel poverty. This was often connected with those living in island and other remote communities, and the typically high levels of fuel poverty in these areas.

It was reported that a relatively high proportion of rural and island homes are detached, traditionally constructed, and hard to treat. There were also references to many properties having minimal insulation, inefficient heating and poor energy efficiency ratings, and to them often being off-gas grid and not likely to be connected to heat networks. Higher construction costs and limited supply chains, higher cost of electricity in remote parts of Scotland and the limitations of the existing electrical infrastructure were also highlighted.

Some respondents welcomed acknowledgement of the challenges faced by remote and island communities, others referenced the importance of an Islands Impact Assessment to assess and mitigate risks, inform development of appropriate policies, and ensure equality in relation to the specific challenges faced by island communities. It was also suggested that policies should be rural proofed at an early stage and that there should be:

- Additional funding for installation of measures and also for district heating feasibility proposals. A specific Rural Homes Transition Package was proposed.
- Support for the island communities that have been early adopters of low/zero emissions heating options and have not benefited from a mature market and supply chain.

The absence of a single, one-size-fits-all solution, a requirement for flexibility and the need to use of different approaches in different locations were all highlighted, including with respect to the differing needs of rural and urban communities and the challenges in remote, rural and island locations.

Some respondents expressed a view that geographically distant decision makers have poor understanding of local issues or that island proofing may be ignored in a centralised policy delivery. Using local advice organisations for tailored

engagement with their own communities was proposed. The importance of early engagement and of bottom-up engagement were highlighted - listening to rural and island communities and engaging in genuine partnership working.

Information, advice and support for consumers

The importance of high quality and bespoke information, advice and support was highlighted by many respondents, including that early advice will be key to allowing people time to plan and budget. Local activities such as community workshops, roadshows, and drop-in sessions were proposed, as were local opportunities to see technologies in action. Expansion of the Green Homes Network was also welcomed as providing an opportunity to see how systems work and to learn from other householders.

The need for information and advice to be tailored according to different audiences or property types was emphasised, the latter particularly with respect to assessment and advice on traditional buildings. Bespoke advice for an individual property and site-specific solutions rather than generic advice were also suggested. The importance of providing realistic information – for example on performance, and on running and maintenance costs was also highlighted.

In terms of the type of support that could be provided, suggestions included:

- Being first point of call for anyone interested in installing zero emissions heating technologies.
- Offering one-to-one support to ensure that the installation and heating costs will be affordable.
- Ensuring that any quality assurance framework, such as TrustMark, is applied.
- Offering additional support around using some of the new technology.

With respect to where such help would be obtained, there were arguments for a one-stop-shop and a 'no wrong door' approach – the latter ensuring all services are available, irrespective of the organisation first contacted. Several respondents argued that it will be important to work with trusted local advice services and community groups or networks, and examples of specific community groups already providing advice and information were cited. It was also suggested that organisations such as Home Energy Scotland, Scarf and Changeworks can provide key support and the potential for Registered Social Landlords and local authorities to work with their tenants, and especially those who are vulnerable, was also highlighted.

There were calls for improved funding to advice services at both national and local grass-roots level, with a specific request for longer-term funding to be provided to local agencies.

Funding packages and financial incentives

For a number of respondents, capital grant funding for some households will be key to a fair and equitable cost distribution, with some suggesting that the Scottish Government will need to provide substantial levels of funding to support the

transition. This included reference to the potentially large proportion of consumers who will find it difficult to meet the capital investment requirements for deployment of low/zero emissions heating.

The consultation paper sets out that transforming Scotland's homes and buildings is a significant investment opportunity and that the Scottish Government will kick-start this transition with almost £1.6 billion of capital funding during the next five years. However, for a number of respondents across a range of respondent types, there were concerns that the £1.6 billion falls short of what will be required, and there was reference to the Scottish Government's estimates of the total cost of transition at £33 billion.

There were calls for grant support for those in fuel poverty and to consider options for those who are 'nearly fuel poor' - who do not qualify for fuel poverty schemes but whose income level is such that energy costs are still a significant factor in household budgets. Grant funding for early adopters was seen as a way to pump prime the market and match funding or the use of cashbacks was also seen as a possible option.

There were also frequent references low cost or interest free loans or to green mortgage products. Specific suggestions included: interest-free loans that cover all of the cost and/or which could be added to a green mortgage; and variable loan payback mechanisms as income changes.

Some form of tax incentive was also seen as having a role to play, and there was a call to align the climate change goals and policies with the tax regime. Specific suggestions included: introducing council tax incentives; using Land and Buildings Transaction Tax rebates or variation in rates; and reduction in rates of, or removal of VAT. Further suggestions included reduced VAT on retrofit-led renovation or removing all VAT on insulation. In relation to VAT reductions, it was suggested that if the UK Government does not adjust VAT rates, the Scottish Government could take action by establishing a VAT reimbursement fund to cover all general home improvement works (with some eligibility criteria), provided a certain Energy Performance Certificate (EPC) rating was achieved.

Fabric first and focus on energy efficiency

A number of respondents, from across a range of respondent types, noted their agreement with continuing to prioritise action on energy efficiency, including because energy efficiency work is typically no regrets and is a key enabler for the deployment of low emissions heating technologies. It was also described as being the cornerstone of fuel poverty reduction, with reducing energy demand a big part of the solution for all properties. However, there were concerns about whether the levels of expected Government financial support will be sufficient given the scale of the retrofitting task.

In terms of any priorities or focus for energy efficiency work, suggestions included that the housing stock in rural Scotland is generally less energy efficient compared to the rest of Scotland, and it is of paramount importance energy efficiency measures are carefully considered prior to, or alongside, the installation of low/zero emissions heating. This applies particularly to off-gas grid properties.

It was noted that differences in construction methods and materials used will mean that no single approach will be appropriate for all buildings, and that it is important not to create problems through the use of inappropriate interventions. There was reference to condensation, ventilation, and air quality. It was suggested that problems are less likely to arise if a sufficiently skilled and knowledgeable workforce is available.

Respondents also highlighted possible problems to be addressed or obstacles that may need to be overcome in order for the energy efficiency agenda to be progressed. They included that in remote rural and island communities, PAS 2035 may have serious implications for local delivery of energy efficiency measures in the short term.

EPC reform

EPC reform was a frequently raised issue from across a broad range of respondent types, with many of those commenting agreeing that the system needs to be reformed or welcoming the Scottish Government's commitment to consult on a reformed EPC assessment process.

Getting EPCs right was described as fundamental to enabling Scottish consumers to take the right decisions on their energy consumption to deliver on net-zero targets. In terms of other positive outcomes that respondents expected or hoped would stem from EPC reform, there was reference to:

- Making EPCs more consumer friendly.
- Helping to reduce the negative impacts of fuel poverty.

There was support for the Scottish Government's proposal to introduce an indicator for heating emissions which will recommend the most appropriate form(s) of heating system to reduce emissions to zero, as appropriate to the building type and fabric, and taking account of wider changes to heat supply in the area. The plan to look at the use of EPCs for mixed-tenure and mixed-use buildings was also welcomed.

Supply chain shortages, particularly around skilled tradespeople

A frequent theme was that the transition to net zero will need to be supported by a robust supply chain and a skilled workforce with sufficient capacity to deliver both energy efficiency measures and the installation and maintenance of low/zero emissions heating systems. This was a frequently raised theme and was highlighted by a range of respondent types.

The possibility that there will be a significant shortage of those with the necessary retrofitting and heat installation skills was identified as a significant risk by a number of respondents. There was also a concern that if any shortages are not addressed quickly, they could lead to poor quality work, unacceptable waiting times and artificially inflated prices. There were concerns relating to a shortage of the necessary skills for retrofitting traditional properties, and in particular around these skills shortages in rural areas and island communities.

It was suggested that time will be needed to ensure that the Scottish supply chain can build the necessary capabilities and capacity to service what will be a rapid growth market and that the supply chain needs long term support through investment for upskilling. It was recommended that Scottish Government review the current supply chain skills base to inform the drive to increase capacity. Respondents also saw a need for a coordinated approach to the transition and building of the supply chain, including a suggested role for a central co-ordinating agency.

The importance of supporting the local supply chain was also highlighted. Related to both funding and support for supply chains, it was argued there must be action to ensure PAS 2035 or TrustMark accreditation does not unfairly impact remote communities. Previous situations where rural communities could not access accredited installers or preferred to use trusted local but non-accredited businesses and hence were unable to access funding were highlighted. Integrating PAS 2035 and TrustMark standards into training programmes was suggested as a means of ensuring staff would be accredited once trained and reducing pressure on SMEs to pay for accreditation.

More general observations or suggestions around accreditation included that robust qualification criteria will be key. Specific suggestions included the development of approved installer schemes. Linking any publicly funded financial support options to the use of accredited suppliers was proposed; the expectation was that taking steps to safeguard the competency and quality of workmanship of those carrying out installations would help ensure consumers are protected.

Infrastructure readiness

The importance of having fit-for-purpose, robust and nation-wide infrastructure, particularly for electricity, was highlighted. It was suggested that significant investment will be required to ensure that Scotland's infrastructure can support the electrification of heat, with the role of the Scottish Government in facilitating investment noted, including suggestions that the required investment may not be deliverable without cross-sector policy support and a significant increase in public sector funding support.

It was also suggested that the Scottish Government must do more to encourage private investment – for example by ensuring it is easier and less expensive for network operators to install upgrades, and by enabling networks to invest ahead of contracted need, to ensure that electricity networks are ready to meet increased demand.

Managing demand to reduce the burden on the electricity network was also an important theme for respondents. This included a focus on the role of storage in managing demand, with a call for greater Scottish Government support for energy storage and the storage market. There were calls for further policy provision, for example, within the upcoming National Planning Framework (NPF4), in relation to energy storage and grid balancing, and including ensuring that storage technologies benefit consumers and suppliers.

Local and community-based approaches

The important contribution of Local Heat and Energy Efficiency Strategies (LHEES) was highlighted frequently and by a range of respondents types, including in relation to identifying areas of priority and opportunity. Given their importance, it was argued that they should be completed and implemented as soon as possible, although others considered the requirement for LHEES to be in place by the end of 2023 date to be overly optimistic, too ambitious or not deliverable.

Irrespective of their view on the timescales, respondents highlighted the significant resources and guidance that local authorities will require. It was argued that an assessment identifying the full cost for undertaking the necessary work stream should be undertaken in partnership with Councils prior to establishing LHEES on a statutory basis. A lack of resource within local authorities was reported to have been a common theme across many of the recent pilot projects. In addition to the significant work involved for local authorities, the time necessary to consult with the local community was highlighted.

In relation to both LHEES and more widely, the importance of taking a community-orientated approach to the transition was highlighted. Targeting engagement to specific local areas and to defined audiences was suggested as was use of a range of methods to ensure all members of the community are included. Factors such as age, mobility and digital literacy were all cited. Tailoring engagement to the concerns and history of local communities was also suggested.

In terms of gaining the trust of the community, working with trusted local partners or established community groups was suggested. Examples given included local voluntary groups and environmental groups; community anchor organisations; faith groups; ethnic minority groups; community councils; social landlords/housing associations; and tenant associations. Advice services and charities – both local and national - and existing local authority communication networks established through production of Local Development Plans or Local Place Plans were also put forward as channels for community engagement.

Development of a local community engagement framework was suggested, and it was argued that guidance to ensure the involvement of local communities in decision making should be made available as soon as possible.

Chapter 1: Introduction

This report presents analysis of responses to a public consultation on the draft Heat in Buildings Strategy.

Background

The draft Heat in Buildings Strategy provides an update to the 2018 Energy Efficient Scotland Route Map and the 2015 Heat Policy Statement and brings together the Scottish Government's ambitions on energy efficiency and heat decarbonisation into a single framework. In 2019, Scottish Ministers passed the Climate Change (Emissions Reduction Targets) (Scotland) Act which set a new target for net zero greenhouse gas emissions by 2045, with interim targets of 75% by 2030 and 90% by 2040. The December 2020 update to the Climate Change Plan set out the very ambitious pathway to decarbonise Scotland's homes and non-domestic buildings in line with Scotland's statutory climate change targets.

Scotland also has ambitious fuel poverty targets, set out in the Fuel Poverty within the Fuel Poverty (Targets, Definition and Strategy) Act 2019, which must be met as we transition to zero emissions heating.

Heating our homes and workplaces accounts for around 20% of Scotland's total greenhouse gas emissions. In order to meet our commitment to net zero emissions and meet the net zero and interim climate change targets, Scotland's homes and buildings must continue to reduce their heat demand and transition to zero emission heating by 2045, with very significant progress made by 2030.

The draft Strategy covers the long-term vision and near term action needed to decarbonise Scotland's building stock in a way that ensures a just and fair transition and continues to tackle fuel poverty. It has been published as a draft for consultation, with feedback used to inform a final Strategy document in due course.

The consultation

The consultation opened on 5 February 2021 and closed on 30 April 2021. It asked 70 questions, six of which had a closed and open element. The remaining 64 questions were open.

The consultation documents are available on the Scottish Government's consultation hub at <https://consult.gov.scot/energy-and-climate-change-directorate/heat-in-buildings-strategy/>.

Number and profile of respondents

In total, 178 respondents made a submission. Respondents have been allocated to one of thirteen respondent groups by the analysis team and the Scottish Government. A breakdown of the number of responses received by respondent type is set out in Table 1 below and a list of respondents who agreed that their response should be published is provided at Annex 1.

Table 1

Respondents by type	Total
Academic Group or Research Centre	8
Community Council, Trust or Group	6
Consultancy, Training, Assessment or Accreditation	13
Consumer Advice, Advocacy or Campaigning	8
Energy Generation, Supply or Distribution	20
Housing Association	9
Individual or Tenant Group	15
Local Authority	23
Product Manufacturer, Supplier or Installer	19
Professional or Representative Body (Energy)	15
Professional or Representative Body (Other)	21
Public Body	7
Third Sector or Non-Governmental Organisation	14
All respondents	178

Points to note about the respondent groups are that:

- The Academic Group or Research Centre category includes a university respondent who focused on the implications of the Strategy for university buildings.
- The Individual or Tenant Group category is made up of 13 individual members of the public and two tenant groups

Where consent has been given to publish a response, it can be accessed at: [Published responses for Heat in buildings strategy - achieving net zero emissions: consultation - Scottish Government - Citizen Space](#)

Nature of responses

Most responses were submitted directly through the Scottish Government's consultation hub. These respondents tended to focus on answering specific questions. A number of respondents did not respond to the consultation questionnaire but submitted their comments in a statement-style format. This content was analysed under the most directly relevant consultation question.

The submissions received were very diverse, with variation based on focus, structure and length, along with the number of questions answered.

The number of respondents answering closed questions ranged from around 55% to 35% of all respondents (98 respondents at Question 26 down to 63 respondents at Question 36). The analysis presented within the main body of the report is based on respondents who answered each question and hence the base number of respondents will vary.

The number of respondents commenting at any of the open questions ranged from 161 at Question 1 down to nine at Question 66.

The comments at open questions ranged from relatively brief statements through to very extensive submissions. These longer submissions were sometimes technical in their nature, containing substantial amounts of information about, and arguments for or against, one or more of the low/zero emissions technologies. This tended to apply particularly to submissions made by Product Manufacturer, Supplier or Installer respondents and Professional or Representative Body (Energy) respondents. It is outwith the scope of this analysis to set out the more detailed and technical arguments referred to above, but all responses are available to the relevant Scottish Government policy team and, as noted above, many of the original responses are available on the Scottish Government’s website.

Analysis and reporting

The remainder of this report presents a question-by-question analysis and is designed to give an overview of the type and range of views expressed. As with any public consultation exercise, it should be acknowledged that those responding generally have a particular interest in the subject area and the views they express cannot be seen as representative of wider public opinion.

The analysis notes the more frequently made comments and gives an indication of the type of respondents making those comments. More generally however, please note that most points were raised by only one or a very small number of respondents. When the type of respondent is referred to within the analysis of comments, the group titles have been abbreviated in some cases, as set out below.

Table 2

Respondents by type	Referencing in analysis
Academic Group or Research Centre	Academic
Consumer Advice, Advocacy and Campaigning	Consumer Advice
Community Council, Trust of Group	Community Council
Consultancy, Training, Assessment or Accreditation	Consultancy
Energy Generation, Supply and Distribution	Energy
Housing Association	Housing Association
Individual or Tenant Group	Individual
Local Authority	Local Authority
Product Manufacturer, Supplier or Installer	Product Manufacturer
Professional or Representative Body (Energy)	Professional Body (Energy)
Professional or Representative Body (Other)	Professional Body (Other)
Public Body	Public Body
Third Sector or Non-Governmental Organisation	Third Sector

Direct quotes are not included within the analysis but please note that original wording from responses, with some editing or paraphrasing as required, is used. This applies particularly when respondents were making technical points or providing specific examples or suggestions.

Please note that the analysis team has not carried out any fact or reference checking as part of the analysis.

The summary accompanying this main report focuses on key themes that reoccurred across many of the questions, including sometimes being raised at a number of questions by the same respondent. Examples would include the importance of considering any impact on fuel poverty or on rural and island communities. The analysis presented below sets out the range of views expressed at any particular question, meaning there is a degree of repetition.

Finally, a list of abbreviations used in the report is provided at Annex 2.

Chapter 2: A 2045 Pathway for Scotland's Homes and Buildings

To meet the net zero target, by 2045 all homes and buildings in Scotland must have significantly reduced their energy use, and almost all buildings must be using a zero emissions heating system. As set out in the Climate Change Plan Update, emissions for homes and non-domestic buildings combined will have to fall by 68% by 2030 as compared to 2020.

The Journey to Net Zero

Question 1 - To what extent do you support the pathway set out for achieving the 2045 net zero target and the interim 2030 target?

The number of respondents answering Question 1 is set out below. The 161 respondents, or 90% of all respondents answering this question, included all Consultancy, Local Authority, Energy Generation and Public Body respondents.

Table 3

Question 1: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	5	3%
Community Council, Trust or Group	6	6	4%
Consultancy, Training, Assessment or Accreditation	13	13	8%
Consumer Advice, Advocacy or Campaigning	8	7	4%
Energy Generation, Supply or Distribution	20	20	12%
Housing Association	9	9	6%
Individual or Tenant Group	15	13	8%
Local Authority	23	23	14%
Product Manufacturer, Supplier or Installer	19	15	9%
Professional or Representative Body (Energy)	15	14	9%
Professional or Representative Body (Other)	21	17	11%
Public Body	7	7	4%
Third Sector or Non-Governmental Organisation	14	12	7%
Total	178	161	100%
% of all respondents commenting		90%	

Comments were sometimes extensive, covering themes that will be picked up on at the analysis of subsequent questions, including at Questions 2 and 3. The focus of the analysis presented here is on broader perspectives on the pathway and the 2045 and 2030 targets.

Support for the overall pathway

Many respondents, from across the respondent types, noted their broad support for the pathway set out, albeit sometimes going on to highlight key challenges that will need to be overcome for either or both of the targets to be achieved.

Reasons given for supporting the pathway set out included that, particularly within the context of the wider Strategy, it represents a significant step forward in addressing the challenge of eliminating carbon emissions from buildings in line with Scotland's climate change targets, concurs with the Climate Change Committee recommendations, and is reasonably consistent with other UK targets.

The pathway was described as ambitious, comprehensive and as seeming to achieve a balance between reaching net zero, protecting consumers and reducing fuel poverty. Other comments included that the pathway:

- Provides clear steps and targets against which the Government can be held to account.
- Will give industry the certainty that is needed to invest in the development of supply chains, training, and production.

Aspects of the broader approach which respondents particularly welcomed included:

- The emphasis being placed on ensuring a fair and equitable transition for all, and on supporting those in or at risk of fuel poverty. This was a frequently raised issue, including by Professional Body (Energy) and Local Authority respondents. The commitment to target funding to support the most vulnerable households through properly funded delivery programmes was welcomed.
- The recognition of the importance of ensuring that homes and other buildings have a good standard of energy efficiency. This was sometimes articulated by respondents as support for a 'fabric first' approach and was a frequently raised issue across a broad range of respondent types.
- The commitment to revisit the Energy Performance Certificate (EPC) assessment process.
- The acknowledgement that supply chains, including those for retrofitting, need to develop, and that this will require government support.
- The role envisaged for certain approaches and technologies, including in relation to heat networks.

Key challenges or concerns

A number of respondents - including those who were broadly supportive of the pathway and those who were less so or who noted their disagreement with the approach set out - highlighted challenges that will need to be considered. Local Authority, Professional Body (Energy) and Energy Generation respondents were

amongst those raising issues, many of which are covered in greater depth at Questions 2 and 3. However, in terms of the overall pathway, observations included that the scale of the ambition will require radical change to current norms, and there will be very significant barriers to be overcome.

There was also a concern that there is lack of clarity on how targets have been established. It was suggested that further research is required to determine the capacity of new technologies to meet targets and the ability of the supply chain to deliver. An associated assessment of the existing funding gap and targeted measures to address this gap was proposed.

On a similar theme, there was a concern that delivering against the pathway, especially within the proposed timescales, will require access to funding and knowledge that do not exist at a scale that matches the ambition. It was also suggested that the absence of a comprehensive policy, regulatory and financial framework makes it difficult to see how the targets set out can be met.

Other concerns included that:

- The limited ability of the Scottish Government to make any major reforms to policy around mains gas makes reform in the heat area extremely challenging without full support from Westminster.
- The draft Strategy does not deliver the amount of certainty and clear messaging that is required to have a significant impact on the market for zero emission heating systems in the short term, and this will then undermine the potential to ramp up to the levels required towards the end of the 2020s.

Other comments also focused on whether the technology available will be sufficient and/or fit for purpose, and included:

- A query as to whether both zero and low emissions forms of heating will be accepted at key milestones through the pathway. There was an associated concern that to accept zero and low emissions heating at an interim milestone, and then to seek zero emissions heating at a later milestone, will lead to further retrofitting on properties that installed low emissions heating at the interim milestone.
- Alternative heating technologies that are adopted early may become prevalent and, by the nature of their market penetration, exclude others from being adopted.

There was also a concern that the Pathway seems to focus on operational carbon, and this could obscure the true environmental impact of the measures taken. It was reported that, while in some cases the additional embodied carbon emissions could be off-set or countered by a deep retrofit, this may not be the case in all circumstances.

From a consumer perspective, there was a call for the delivery of affordable warmth to be given equal consideration. It was suggested that protection of the most vulnerable and ensuring they do not suffer as a result of change should be fundamental, with equality in accessing affordable warmth an equal goal to the environmental objectives.

Further challenges identified, or concerns raised, included around:

- The availability of the new technologies, particularly in rural and island areas, and including network capacity.
- Capacity within the industry, including the training and accreditation of a skilled workforce.
- Potential costs to households, including those in the asset rich/cash poor category. There was a concern that the pathway does not address how households will be supported to meet the targets and key dates that have been set out. It was also suggested that it does not take into account the needs or realities of rural households and businesses, leaving its ambitions unaffordable and unsuitable for many.
- Capacity within Local Government to develop Local Heat and Energy Efficiency Strategies (LHEES).
- The challenges for social landlords, including because of uncertainties around costs and the available funding options going forward, balanced against the need to develop 30-year financial projections and decisions being made now impacting on compliance with the longer-term targets.
- The specific ways in which traditional and historic buildings will play their part.

Interim 2030 target

The consultation paper states that by 2030 around 50% of homes will need to convert to a zero or low emissions heating system. This will mean converting the vast majority of 167, 000 off-gas homes that currently use high emissions oil, LPG, and solid fuels, as well as at least 1 million homes currently using mains gas to zero emissions heating. An estimated 50,000 of Scotland's non-domestic properties will also need to convert to zero emissions sources of heat.

A number of respondents, from across a range of respondent types, commented specifically on the interim target, including sometimes offering support for the use of an interim target. Reasons given included that it: allows progress to be tracked and monitored; supports public policy approaches being adapted as and when is necessary; and will help increase accountability. It was also seen as providing clarity for both industry and consumers in the overall context of achieving net zero emissions by 2045.

There was also support for the interim target itself, with further comments including that the target to decarbonise heat in one million homes by 2030, and its recognition that available and existing technologies - including fabric upgrades, heat pumps and heat networks - will be the key technologies needed to meet this commitment.

The target was described as challenging or ambitious, with this ambition seen as reflecting the scale and urgency of the challenge. However, it was also noted that an ambitious target is not without risk, particularly with the proposed timescale. Related comments included that achievement of the interim target will be reliant on:

- Ongoing consultation with industry - including developers, producers and manufacturers as well as the end user businesses, such as wholesalers - to ensure businesses are ready.

- Engagement with communities, to raise awareness and win hearts and minds that change is required, in turn generating demand.
- The Scottish Government applying appropriate measures to trigger sustainable decision making by property owners.
- The necessary physical infrastructure being both capable and available across the whole of Scotland. It was suggested that significant investment will be required to ensure that Scotland's infrastructure can support the electrification of heat. These issues are covered in greater detail at Chapter 5 - Preparing our Energy Networks.

It was also suggested that the 2030 target offers significant opportunities for green jobs and supply chain development, with associated positive impacts on education and skills.

However, others were concerned that the 2030 is not realistic or achievable or could lead to undesirable outcomes. On this latter issue there was a concern that the speed at which the programme for delivery would need to be agreed will require rapid technical policy decisions that may have long-term consequences if they are overtaken by future technological developments in heating. One suggestion was that the Strategy should be technology agnostic as this will allow the Scottish Government to draw on multiple technologies and vectors in case their preferred route is not ramping up quickly enough. These issues are returned to at Questions 2 and 3.

Other comments included that the 2030 target:

- Would not be accepted by customers because of the high upfront costs and disruption of the solutions proposed.
- May be too challenging for Housing Associations to achieve. Further, it was reported that, given that the Registered Social Landlord (RSL) sector usually leads in achieving energy efficiency targets and is probably best placed for achieving net zero, it is likely that other sectors will struggle even more.

Suggested alternatives included changing the interim target date to 2035. It was also suggested that, given there are reserved matters regarding energy infrastructure, and some other relevant policy areas, alignment with the Sixth Carbon Budget¹ may be a more pragmatic aim.

Earlier targets

Although most who commented either supported the targets or were concerned that they are too ambitious, there was also a view that targets should be earlier or more ambitious. This included a recommendation that the 2045 target for Net Zero is brought forward to 2030. It was suggested that such a target would recognise the

¹ In December 2020 the Climate Change Committee recommended that the UK sets a Sixth Carbon Budget to require a reduction in UK greenhouse gas emissions of 78% by 2035 relative to 1990, a 63% reduction from 2019. The report is available at <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf>

urgency of addressing the climate emergency and would match the ambitious aims set by a number of local authorities in Scotland.

Please note that comments relating to other targets, including tenure-specific targets, are covered at subsequent questions, and at Question 48 in particular.

Question 2 - What are your views on any risks of unintended consequences from this pathway?

The number of respondents answering Question 2 is set out below. The 144 respondents, or 81% of all respondents answering this question, included all Local Authority and Housing Association respondents. Some responses were extensive, including those from a number of Energy Generation, Housing Association and Third Sector respondents.

Table 4

Question 2: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	4	3%
Community Council, Trust or Group	6	6	4%
Consultancy, Training, Assessment or Accreditation	13	12	8%
Consumer Advice, Advocacy or Campaigning	8	6	4%
Energy Generation, Supply or Distribution	20	16	11%
Housing Association	9	9	6%
Individual or Tenant Group	15	11	8%
Local Authority	23	23	16%
Product Manufacturer, Supplier or Installer	19	14	10%
Professional or Representative Body (Energy)	15	13	9%
Professional or Representative Body (Other)	21	13	9%
Public Body	7	6	4%
Third Sector or Non-Governmental Organisation	14	11	8%
Total	178	144	100%
% of all respondents commenting		81%	

A number of comments identified possible risks that could result from the pathway, although there were also suggestions as to how unintended consequences could be avoided or their risk minimised. These included taking a bottom-up approach to rolling out measures. It was suggested that local approaches and plans, including LHEES, will play a key role in avoiding unintended consequences and that it will also be important to:

- Adopt a coherent, evidenced-based strategy for targeting funding at an area-based level.
- Take a whole system approach, which includes an understanding of how sequential investment can support a cost-effective transition.
- Learn as we go, including by sharing mistakes and successes and adapting quickly based on learning.

However, there was also a note of caution that it may not be possible to mitigate all risks but that, given the scale of the change needed, this should not delay the urgent progress required. This was linked to an overarching risk that the key targets set out in the pathway are not met, for example because there is not sufficient support from the public and private sector, and the roll-out is slower than anticipated in the early years.

Energy costs and fuel poverty

The risk of affordability issues for consumers, and in particular the risk of households continuing in or falling into fuel poverty, was the most frequently-identified possible risk and was raised by a broad range of respondents, including a number of Consumer Advice or Third Sector respondents.

This was generally associated with concerns that energy supply costs would increase, including through the loss of access to cheaper options, especially mains gas, and a move to the increased use of electricity. It was reported that, based on assumptions and the solutions currently available, getting to net zero could add between £200 and £800 per year to household energy bills.

With the majority of homes in Scotland currently reliant on gas, it was suggested that the deployment of zero emissions heating systems at the rate required to meet the net zero target could result in considerable fuel cost increases unless other mitigating measures or wider reforms are implemented.

In terms of those reforms (and as discussed further at later questions), it was noted that Scotland currently has no power to intervene effectively in the energy market to secure lower electricity prices as this is an area reserved to Westminster. There was an associated concern that, if it is not possible to address the systemic imbalance between gas and electricity pricing without otherwise guarding against increases in fuel poverty, the policy changes required to achieve decarbonisation could be stalled.

However, in relation to any rebalancing of electricity and gas costs, it was suggested that the timing of any increases in gas costs would be critical and needs to coincide with significant progress in the roll out of electrical based heating systems. If not, it was argued there is a risk that householders still using gas will see increased costs and therefore higher levels of fuel poverty.

Also in terms of mitigation of risk, and from a systemic perspective, it was reported that the financial commitment needed to avoid loading costs onto users will be very substantial. There was a concern that the current funding commitments are insufficient, that private sector investment will need to cover much of the early-stage

capital investment, and that commercial suppliers will pass these costs on to heat customers.

In terms of the households that may be most vulnerable to price rises, it was suggested that:

- There could be particular challenges for those on restricted tariffs/prepayment meters, especially during periods of cold weather when they could see a sharp spike in immediately payable costs.
- The phasing out of currently relatively cheap fossil fuel heating options, such as heating oil, is likely to have a particular impact on those living off the gas grid.
- The combination of being off-gas grid and living in a hard to treat property presents particular risks around increased fuel poverty.

It was also noted that the risks are associated not only with supply costs but also with capital costs. Specifically, it was suggested that homeowners living already in fuel poverty could be further marginalised due to the higher financial burden of improving the energy efficiency of aged homes and buildings.

Older households: There was also a concern that older households, who could be some of the least able to afford or engage with and manage the work to their homes, may be placed under particular pressure. The importance of not assuming that all older homeowners can afford the changes that their homes may require was highlighted. It was reported, for example, that older people may live on a low fixed income and be unable to afford unexpected costs that are outside their budget.

Lower income households: There was also a more general concern that homeowners at the entry level and in lower income brackets may be left behind and that a multi-level system could be created, with higher earners being able to afford and implement strategies and affordable housing meeting the demands through public funds, leaving those who do not meet the criteria for state support unable to meet the costs of upgrading their property.

Those living in rural and island communities: There was also reference to rural and island communities, including for example that a significant percentage of the population of the Highlands and Islands is already in fuel poverty, and in some cases, extreme fuel poverty. There was a concern that, in the desire to secure bigger and easier wins in urban areas, island areas with more dispersed populations will be left behind in the transition to net zero, despite having the greatest access to renewable resources to support decarbonisation.

Social rented sector tenants: There was specific reference to the impact on those living in the social rented sector, with a concern that the level of investment required to increase energy efficiency may either fail to make a significant reduction in fuel poverty or simply replace fuel poverty with rent poverty.

There was a call for the roll out of low or zero emissions heat to be done in an inclusive and just manner, that takes account of regional differences. More widely, it was suggested that all energy-related actions, policies and legislation should be fuel-poverty proofed to mitigate risk.

Importance and timing of energy efficiency work

As at a number of other questions, there was support for a fabric first approach, with a broad range of respondents commenting on this theme. There was a concern that, without a sufficient focus on repairing and retrofitting existing housing stock, the pathway will fail to drive improvements to the energy efficiency of Scotland's housing stock, and in turn to reduced demand for heat. The connected concern was that installing zero emissions heating in properties where demand has not been reduced and which are not energy efficient, may result in higher costs, including to fuel poor households.

Specifically, it was noted that while the pathway sets out a 2030 interim target for the uptake of zero or low emissions heating, the target for ensuring that all homes meet a minimum standard of energy efficiency (where feasible) falls in 2035. The concern was that heat technology installations may run ahead of energy efficiency retrofits, reducing the potential benefits. It was suggested that this risk could be minimised by ensuring that the installation of any zero or low emissions heating system is coupled with a sufficient fabric upgrade (where needed).

However, another perspective was that, while a deep retrofit could be done alongside the installation of low/zero emissions heating, this could lead to consumers being required to make significant capital expenditure in a very short time period as opposed to being phased over multiple years. An earlier prioritisation of energy efficiency improvements was preferred.

Also in relation to ensuring households benefit as much as possible from the transition, it was stressed that thought should also be given to air quality and that energy efficiency measures linked with domestic ventilation strategies should be combined with consumer education around effectively managing moisture in properties.

Property type risks

Connected to the requirement to improve energy efficiency and reduce demand for heat were a number of points around the particular challenges of improving energy efficiency or installing zero emissions heating in certain types of property.

It was suggested that there is a risk of unintended damage to the traditional (pre-1919) building stock if a one-size-fits-all approach is adopted, whether in the domestic, public or commercial sector. The main risks were identified as being around poor-quality installation of fabric improvements or fabric improvements which use inappropriate materials. This could lead to problems, such as mould growth, which can in turn lead to adverse effects on health and building fabric. It was noted, for example, that traditionally constructed buildings usually have solid wall construction and are vapour permeable and can be damaged by inappropriate energy efficiency measures.

With specific reference to listed buildings and conservation areas, there was a concern that they could suffer damage to their quality and character unless great care is taken. Further comments or suggestions included that:

- Listed buildings must be treated as individual entities, an approach justified by the low original CO₂ released in their construction, especially compared to the high embedded CO₂ of modern buildings.
- Joinery internal features and finishes of historic buildings may well suffer from a consistently higher temperature and drier atmosphere caused by energy efficiency measures.

Impact on the housing market and supply

Local Authority and Housing Association respondents were amongst those identifying a range of possible consequences related to the housing market and levels of supply and demand in particular. These are covered in turn below.

Impact on new build prices: It was suggested that housing developers will try hard to protect their current margins and, unless compensated through other means, it is likely that, at least in the short-term, the cost of new homes will rise.

Reduction in new build private supply: It was suggested that land developers and house builders may be concerned that improved energy efficiency standards and low/zero emission heating solutions for new buildings, and the higher costs noted above, could impact on appetite of land developers for acquiring land and preparing plots and the preparedness of developers to take risk. However, it was also suggested that any reluctance is likely to be temporary and, given a level playing field for all, it will ultimately drive cost efficiencies, innovation and adoption of improved standards across the building industry.

Impact on new build supply within the social rented sector: Increased costs for new build attainment of thermal efficiency and zero emissions at point of use may reduce the capacity of developers within the social rented sector to maintain or increase current delivery targets. Without increased levels of grant provision, delivery of the anticipated unit completions may not be affordable which, in turn, may negatively affect the transition from high emission systems, particularly where large-scale replacement of older house types by new, energy efficient homes is proposed.

Older, traditional buildings go out of use or are marginalised: There was a concern that building owners may find it more attractive to move to new, efficient buildings rather than upgrading old buildings. This may leave a legacy supply of underutilised, inefficient buildings and could drive property values at both ends of the spectrum. There was a concern that, at its extreme, this could stratify society into those who can afford an efficient building versus those who cannot.

There was a specific concern about traditionally built homes, particularly in rural areas, being put out of use due to the costs of energy efficiency measures or due to practical difficulties, such as rural skills shortages, in improving a property's EPC rating. It was seen as important that rural homes are kept in use, particularly at a time when the current levels of housing stock are not sufficient to meet demand and the Scottish Government has recognised the need to invest in maintaining rural population levels.

Loss of properties within the Private Rented Sector: A similar suggestion was many owners of rural Private Rented Sector (PRS) properties will be unable to bring

their houses up to the required standard without investing significant amounts of capital, which they will likely be unable to recoup. There was a concern that this could lead to properties being removed from the PRS, and that this will lead to the loss of a high number of homes that are let out for affordable rents. It was suggested that the impact on lower cost rental properties will be disproportionate, due to the nature of a lower capital value making it harder to justify a significant upgrade spend, which could be a large percentage of the overall value of the property.

Slowing of housing market transactions: It was thought that a requirement to only sell or rent homes with an EPC Band C from 2024 may lead to a reduction in housing market transactions.

Decline in property values: In terms of the private residential market, house price decline for some properties was seen as a possible risk, with some properties becoming unsellable if high-cost refurbishments are not completed. It was suggested that mortgage lenders will need to be consulted as the changes could result in properties on which a mortgage cannot be raised.

Also with reference to mortgage lenders, it was suggested that some of the pathway's requirements could devalue some properties on their books that cannot be practically or cost-effectively improved, potentially leading to a two-tier market and possible negative equity outcomes for some households whose properties could be left with a higher carbon impact than properties which are easier and cheaper to improve.

A potential decline in property values could also potentially reduce pension fund demand for Scottish domestic property ownership.

Public acceptance of technological solutions

Although the importance of taking action was widely recognised, it was also noted that this does of itself bring certain risks, especially when the imperative to make progress means we must learn as we go.

It was suggested that there could be risks for early adopters, not only in terms of the reliability of technologies but also their cost - both in terms of capital and running costs. This was connected to an individual owner selecting a solution which may not be right for the property in question and to the risk of mass roll-out systems that do not perform as well as expected. While it was suggested that, in some cases, the impact of underperformance may be minimal, and therefore within acceptable margins, there was a concern that in other cases it could be significant and worsen rather than alleviate fuel poverty.

A concern was that there could be a substantial and sustained consumer backlash against one or more low/zero emissions heating technologies – it was suggested that previous attempts to stimulate a rapid expansion in the market for energy efficiency and low/zero emissions technologies hold important lessons for the Scottish Government, with the UK Government's Green Deal (2012-2015) cited as an example.

Current levels of consumer awareness were also seen as a significant barrier to delivering the Scottish Government's decarbonisation ambitions. It was suggested that Government, industry, and wider stakeholders need to do more to improve consumer awareness. However, the potential for unintended consequences stemming from an institutional, top-down approach that is not effective in listening to communities were also noted. There was a concern that any undervaluing of community skills and input could result in much lower and slower progress than is needed, lack of buy-in, poor choices and lost opportunities.

Strategic choices and infrastructure readiness

The consultation paper sets out that in order to make progress now against net zero ambitions we must begin accelerating and scaling up the deployment of already tried and tested measures such as improved energy efficiency, and primary heating system technologies where they are known to be no or low regrets. Respondents' views on the opportunities or risks associated with particular technologies or approaches are covered at Question 3.

More generally, however, it was suggested that there is risk in supporting technology choices that may not be serviceable through existing infrastructure. These issues are covered further at Chapter 5 - Preparing our Energy Networks but, in summary, concerns included that electricity network resilience, constraints and development uncertainties could present challenges and that these could be particularly acute in rural areas and the islands. Professional Body (Energy) and Professional Body (Other) respondents were amongst those suggesting there could be challenges.

It was also suggested that opportunities could be missed because of lack of certainty around the technologies that will be available and prioritised for support. An example given was that new builds could be designed with no gas supply only to find out that hydrogen will be adopted, resulting in additional costs and disruption to provide the required infrastructure.

In addition to considering the impact that the national direction of travel could have, there was also a concern that technology solutions in certain geographies could be mandated through LHEES. It was suggested that the sector will only invest in the products, skills and jobs required to address the available market and that specifying acceptable technology solutions through LHEES will foreclose parts of Scotland to alternative products and services. Feeding back into the national picture, it was suggested that this would limit the case for investment in those technologies and will stifle the supply chains necessary to support them. It was thought that This is likely to be counterproductive to the overall net zero ambition, even if it might attract investors to technologies receiving preferential treatment in the ringfenced geographies.

Supply chain shortages, particularly around skilled tradespeople

Supply chain shortages, and particularly the possibility that there will be a significant shortage of those with the necessary retrofitting and heat installation skills was identified as a significant risk by a number of respondents from across a broad range of respondent types. These issues are picked up again at subsequent questions, and at Chapter 9 – The Economic Opportunity in particular but, in summary, comments

included that there will be a period of time that it takes in order to ensure that the Scottish supply chain can build the necessary capabilities and capacity to service what will be a rapid growth market.

There was a concern that if potential issues around skills availability are not addressed quickly, they could lead to poor quality work, unacceptable waiting times and artificially inflated prices. There were concerns relating to a shortage of the necessary skills for retrofitting traditional properties, and in particular around these skills shortages in rural areas.

It was suggested that the supply chain needs long-term support through investment for upskilling and mobilisation of the workforce to allow a transition to the green sector.

Strategic Technologies to 2030

The consultation paper sets out that, in order to make progress now against net zero ambitions, deployment of already tried and tested measures must be accelerated and scaled up. Over the next decade the following no or low regrets strategic technologies are proposed:

- Continuing to prioritise action on energy efficiency, both the retrofit of existing buildings and increased energy performance of new buildings.
- Deployment of individual building heat pumps in buildings off the gas network which currently use high carbon heating fuels.
- Deployment of heat pumps in certain buildings currently using mains gas particularly in areas least likely to receive a mains hydrogen supply in the future and buildings for which initial assessments suggest heat pumps are likely to be cost effective in the short-term.
- The development of low and zero emissions heat networks in areas deemed suitable.

Question 3 - What are your views on our assessment of strategic technologies in low and no regrets areas to 2030?

The number of respondents answering Question 3 is set out below. The 147 respondents, or 83% of all respondents answering this question, included all Housing Association and Professional Body (Energy) respondents.

Table 5

Question 3: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	5	3%
Community Council, Trust or Group	6	5	3%
Consultancy, Training, Assessment or Accreditation	13	10	7%
Consumer Advice, Advocacy or Campaigning	8	6	4%
Energy Generation, Supply or Distribution	20	19	13%
Housing Association	9	9	6%
Individual or Tenant Group	15	12	8%
Local Authority	23	22	15%
Product Manufacturer, Supplier or Installer	19	16	11%
Professional or Representative Body (Energy)	15	15	10%
Professional or Representative Body (Other)	21	10	7%
Public Body	7	6	4%
Third Sector or Non-Governmental Organisation	14	12	8%
Total	178	147	100%
% of all respondents commenting		83%	

Comments were often extensive, sometimes containing a significant amount of supporting information and technical detail relating to the pros or cons of different technologies. Product Manufacturer, Energy Generation, Consultancy, Professional Body (Energy) and Individual respondents were amongst those submitting this type of response at this question.

The analysis below focuses on key issues or themes and draws directly on the comments made; no fact checking or verification process has been carried out. As noted in the Introductory chapter, all responses are available to the relevant Scottish Government policy teams, and many can be accessed through the Scottish Government's website.

Broader perspectives on the assessment

A number of respondents, from across a broad range of respondent types, commented that they were broadly supportive of the assessment of strategic technologies to 2030 and agreed that the immediate focus should be on low and no regrets interventions. In terms of that joint focus, comments included that it increases the options available and will support the early action which will be crucial to delivering the scale of change in the very short time period.

Further comments included that it is sensible to focus on technological solutions where cost uncertainty is low and the installation and running costs are well understood. However, it was also suggested that the potential performance gap should be acknowledged and there was support for the plan to carry out further research on *in situ* heat pump performance.

The tension between the need to make short term progress on decarbonisation and longer-term technological development was highlighted, including that it may be some time before certain technologies can make a significant contribution to the energy mix and be commercially available at scale. One view was that the set of technologies defined for low and no regrets areas to 2030 should be the basis of technologies to underpin plans to achieve 2045 targets.

Another perspective was that a heating technology agnostic approach should be followed as far as practicable and while options develop. Professional Body (Energy) and Professional Body (Other) respondents were amongst those taking this view. It was suggested that to do other than take a technology agnostic approach will risk higher heat decarbonisation costs over the longer term and reduce consumer choice, with potentially adverse impacts on both the 2030 target and the target of achieving net zero carbon emissions by 2045.

It was suggested that further research into some technologies, including hydrogen and geothermal energy, is required prior to their deployment at scale, but that decisions on technology pathways must also depend on clear evidence on public acceptance and clarity on how the costs will be born in a fair and just way. It was also suggested that the definition of cost-effectiveness will have an important bearing on the uptake of strategic technologies and that it would be useful for the further research to consider this, where there are knowledge gaps regarding the proposed low or no regrets applications. Combined with existing understanding, this could provide important evidence to support the setting of regulation in the 2023-2025 timeframe.

In addition to further research and information on the various technological solutions, respondents also sought more information or clarity about:

- Whether both zero and low emissions forms of heating or only zero emissions forms of heating will be accepted at key milestones through the pathway. The connected concern was that to accept zero *and* low emissions heating at an interim milestone and then to seek zero emissions heating *only* at a later milestone will lead to further retrofitting on properties that installed low emissions heating at the interim milestone.
- The energy performance characteristics of buildings across Scotland, along with the levels of fuel poverty. It would be helpful for the Scottish Government's supporting documents for the Heat in Buildings Strategy as set out in the supporting Strategic Environmental Assessment: Environmental Report to have included more detail.
- The longer-term unit cost of different types of fuel, including electricity, hydrogen and mains natural gas. An understanding of prices was described as a cornerstone in enabling low and no regrets action to be taken.

Although many respondents supported the approach set out, there were concerns that it implies that consumers will be used unwittingly as part of the learning process. Reflecting themes at Question 2, it was suggested that this risks compromising the chance of a fair transition and eroding customer support because it is inevitable that a significant proportion of outcomes will be sub-optimal and early adopters will face disproportionately higher costs. A connected suggestion was that, if learning by doing is considered to be necessary, it would make more sense to start with the locations that are easiest. An example given was identifying clusters of urban buildings where there are fewer variables, with the connected suggestion that this approach would help with building the skills and confidence to tackle harder to treat buildings.

It was also suggested that there also needs to be guidance or assurance of the right technology in the right place approach. Although it was reported that this will be partially dealt with by creating zones for heat networks and through LHEES, there was a call for guidance describing which technology is needed in which circumstances and setting out in finer detail some of the indicators that point to the right technology for each location.

Energy efficiency first

A number of respondents, from across a broad range of respondent types, noted their agreement with continuing to prioritise action on energy efficiency, with further general comments including that energy efficiency work is typically no regrets and is a key enabler for the deployment of low emissions heating technologies and of heat pumps in particular. Reflecting some of the comments at Question 2, it was also described as being the cornerstone of fuel poverty reduction, with reducing energy demand a big part of the solution for all properties. Other benefits identified included that:

- Both the capital and running costs associated with a heat pump may be reduced if a heat pump is installed in an energy efficient property, as a smaller, more appropriately sized heating system may be installed.
- Energy efficiency work can support local job creation – through both retrofit and the development of the manufacturing supply chain.

In terms of priorities or focus for energy efficiency work, suggestions included that:

- 'Whole house retrofit' is more cost-effective than undertaking multiple interventions over time.
- The housing stock in rural Scotland is generally less energy efficient compared to the rest of Scotland, and it is of paramount importance that energy efficiency measures are carefully considered prior to, or alongside the installation of low/zero emissions heating. This applies particularly to off-gas grid properties.
- Since it is possible that developments in the use of hydrogen could mean that gas systems remain an option in the longer term, it would make sense to focus on off-gas grid communities and, where possible, the use of proven complementary technologies like solar photovoltaics (PV).

It was noted that differences in construction methods and materials will mean that no single approach will be appropriate for all buildings, with other retrofit-related issues raised including that:

- The installation of improvements to roofs, windows, walls and floors in a retrofit context may not be “low regret” if these measures are not installed correctly.
- The risks of unintended consequences are many and varied; they are more likely to occur when insufficient design work has been put in, or there is a lack of knowledge and skills amongst installers. These risks are much less likely to be an issue if investment in training, and a sufficiently skilled and knowledgeable workforce, are available. It was suggested that basic re-training courses do not provide the in-depth knowledge that is required to assess the most suitable ‘retrofit’ methodology, which instead requires years of experience and knowledge.

There was also a concern that the emphasis on energy efficiency first – while sound in principle – could be problematic in certain instances. The example given was that if a heating system is not working and needs to be replaced as quickly as possible, it would not be realistic to expect a household to have potentially expensive and disruptive energy efficiency work done in order to have functioning heating.

Local Authority respondents were amongst those highlighting technical issues that should be considered. Points raised included that the parameters of ‘cost effective’ would need to be clarified as, taking public buildings as an example, the internal or external cladding of an existing building would not be deemed cost effective under current spend to save, Salix or other avenues for funding. Other comments included that:

- Ventilation (natural or forced) in dwellings is important as poor air quality can create a host of other issues. For example, it was suggested that air quality management systems will be required in buildings with heat pumps to prevent problems of poor internal air quality, condensation and mould growth.
- With retrofit of existing buildings, such as schools, there is often limited space, so size is important, particularly where buildings are converted to wet heating.

Respondents also highlighted possible problems to be addressed or obstacles that may need to be overcome in order for the energy efficiency agenda to be progressed. They included that in remote rural and island communities, PAS 2035² may have serious implications for local delivery of energy efficiency measures in the short term.

The cost implications and funding requirements for both existing and new build social rented sector stock were also highlighted with comments including that:

- The £1.6 billion across all buildings that has currently been committed seems insufficient for the task. For example, it was reported that the level of

² PAS 2035 provides a specification for the energy retrofit of domestic buildings, and details best practice guidance for domestic retrofit projects.

investment required to get Council homes alone to a 'heat pump ready' level of energy efficiency has been estimated at £5 billion.

- The cost of building new homes is increasing, and with further improvements to fabric standards expected later this year as part of the revisions to Section 6 of the Building Standards, and the proposed shift to 'ultra-high levels of energy efficiency' recommended by the Committee on Climate Change, costs are expected to increase further. With reference to the social rented sector, it was suggested that delivering new homes with high levels of energy efficiency will only be achieved if there is adequate funding available to support the Affordable Housing Supply Programme.

General comments about heat pumps

Heat pumps were the focus of a number of the more extensive comments made, including from some Professional Body (Energy) respondents.

General observations included the view that they are a known quantity and likely to be a suitable option for many domestic and non-domestic buildings and can be used in a range of contexts, including urban and rural settings and for old and new properties. A number of respondents welcomed the decision to publish further research on heat pump performance *in situ* across Scotland, and it was suggested that the research will inform crucial decisions on the viability of and dependency on different heat technology approaches, and may also inform the ongoing review on the use of hybrid heat systems. It was suggested that the work will be crucial to accurately assessing performance for the Scottish climate.

However, some concerns were also raised, including by Professional Body (Energy) or Local Authority respondents. They included whether heat pumps are an effective option for certain types of housing stock and some non-domestic buildings. Specific concerns were in relation to:

- Heat demand of a property. It was suggested that many homes are not affordably or easily retrofitted in order to make heat pumps cost-effective and that heat pumps are not suitable with properties that have a higher peak specific heat demand, with 80-100 W/m² and above cited.
- Installation and running costs. It was suggested that heat pumps are unaffordable for many and that there need to be minimum energy efficiency criteria to ensure that households are not left with higher bills or a colder home.
- Disruption to the floors and interiors of homes at installation. There was reference to the size of radiators required and the requirement for hot water storage (which has been removed from almost all homes with gas systems).
- Running temperatures, and time taken to reach any given temperature.
- Length of operational life, including vulnerability to frost damage.
- Noise levels, particularly in high-density developments.

There were also concerns that, while for many households a change to a heat pump would simply mean getting used to a new way of using their heating systems, it could be difficult for others. There was reference to older people, those with disabilities or

limiting long-term illnesses and there was a concern that peoples' health could be put at risk if a heat pump is not specified, installed and operating properly.

Those raising concerns around the use of heat pumps sometimes advocated alternative solutions including, for example, the potential of bioLPG or hydrogen. These alternatives are discussed further below.

In addition to comments on alternative heat sources, there were also specific comments on the difference between air source and ground source heat pumps. With reference to the former it was suggested that:

- There can be performance issues, especially at higher latitudes and during periods of cold temperatures.
- The driver for air source over ground source heat pumps comes from England and from large multinational companies.

It was suggested that ground source heat pumps may prove to be better placed for seasonal performance, but that there are physical limitations that restrict their use depending on available or suitable land. However, it was also suggested that large areas of Scotland are underlain by granite and other igneous rocks which are an exceptionally good source of low/zero emissions heat when coupled to a heat pump. It was also reported that, if correctly installed, ground source heat pumps can achieve more than twice the efficiency of air source heat pumps. There was a call for the Scottish Government to help the industry grow the knowledge base around ground source heat pumps, and to provide funding to reduce installation costs.

Heat pumps for off-gas grid properties

A number of respondents offered their support for the consultation paper's suggestion that one of the no or low regrets strategic technologies should be the deployment of individual building heat pumps in buildings off the gas network which currently use high carbon heating fuels. Those taking this position included Professional Body (Energy), Professional Body (Other) and Product Manufacturer respondents.

Reasons given for supporting this approach included that it offers a first 'big win'. In terms of key issues to consider, suggestions included that:

- Installations must be considered on a case-by-case basis to ensure inappropriate solutions are not rolled out.
- As discussed above, deployment of heat pumps without adequate consideration of building fabric performance could lead to high costs for consumers, inefficient operation and increased strain on the electricity grid. It is paramount that energy efficiency is prioritised, and the suitability of the building assessed prior to the installation of heat pumps.
- Financial incentives to encourage switching to heat pumps will be essential.

However, not all agreed that heat pumps offer the best or only alternative for off-gas grid properties. Energy Generation and Professional Body (Other) respondents were amongst those suggesting that heat pumps

are not a no regrets technology for all off-gas grid home as they are not proven at scale and questions remain about their performance. There was some concern about with the emphasis the Scottish Government has placed on heat-pumps. Further comments included that:

- Given the off-grid nature of many remote rural communities, they lack the necessary electrical infrastructure needed for the greater electricity demand that heat-pumps require.
- Heat pumps are unaffordable for many. An example given was that the costs for an off-grid pre-1918 detached family home could be 40% higher by switching to a heat pump rather than to switching onto LPG/BioLPG.

There was a call for further research into other low/zero emissions heating options, which will in turn improve consumers' ability to choose an option that best suits their property.

In addition to differences about whether heat pumps offer the best or only option for providing low/zero emissions heat to many off-gas grid properties, there were also different perspectives about the relative merits of fuel sources being used at present. These included suggestions that the use of heating oil puts little pressure on the national grid or the electricity infrastructure.

Heat pumps in certain buildings currently using mains gas

There were also a number of comments about the deployment of heat pumps in certain buildings currently using mains gas, particularly in areas least likely to receive a mains hydrogen supply in the future, and buildings for which initial assessments suggest heat pumps are likely to be cost effective in the short-term. Academic, Housing Association, Product Manufacturer and Third Sector respondents were amongst those commenting.

Comments included that it is essential that homes on the gas grid are supported to decarbonise as soon as possible and that while alternative gas solutions are under development, the deployment of established heating technologies such as heat pumps should be encouraged. It was suggested that, to avoid delays while awaiting a decision on hydrogen, the identification of on-gas grid properties least likely to be served by hydrogen should be a priority for LHEES.

However, it was also suggested that the approach is complicated by the determination of where hydrogen is less likely to be an option, including where it is likely to be more or less expensive than electrified heating. It was suggested that areas nearest to gas terminals and carbon storage access are likely to be less expensive locations for hydrogen-based buildings heating, and if some on-gas regions are to be prioritised for hydrogen demonstrations, then it would be sensible to target those regions.

Another perspective was that prioritising homes without potential for mains hydrogen supply will risk a missed opportunity to act quickly in line with the demands of the climate emergency. There was a call for all buildings currently heated by networked gas to be screened for eligibility for heat pumps or heat networks as part of the

development of LHEES. It was reported that hydrogen is a premium fuel, and it is unlikely that it will be better or cheaper than heat networks.

From an RSL perspective, there was a call for clarity as to whether landlords should replace gas boilers with electric heating or retain the gas heating infrastructure and wait for the roll-out of hydrogen through the gas network. It was recognised that some decisions will be dependent on the UK Government, and that the Scottish Government has signalled that hydrogen is unlikely to play a significant role until 2030, but it was also stressed that landlords need greater certainty to support current decision making and approaches to the achieving the Energy Efficiency Standard for Social Housing post-2020 (EESH2) target.

Also from an RSL perspective, and in relation to cost-effectiveness, there were concerns about the significantly higher capital investment associated with heat pumps when compared to conventional gas boilers, and other electric systems, as well as in relation to higher running costs. On the upfront costs, typical capital costs of £7,000 per air source heat pump compared to approximately £2,000 for gas boilers and £5,000 for electric storage systems were reported. There were also concerns about the longer-term maintenance cost and appliance lifespans being shorter than expected.

Hydrogen

In addition to comments about heat pumps in areas least likely to receive a mains hydrogen supply in the future, a number of respondents commented more widely on the possible future role of hydrogen. Energy Generation, Professional Body (Energy) and Professional Body (Other) respondents were amongst those commenting.

There were calls for more to be done to establish the role of hydrogen in reducing emissions from existing buildings, with the commitment to further explore policy options for the non-domestic sector welcomed.

Others were looking for an early indication of the role and scale of hydrogen, including in the domestic heating market. The connection was made to boiler replacement and to RSLs avoiding replacing components before their natural replacement cycle.

In terms of the preferred approach, it was reported that 100% Hydrogen will be available before 2030, and that the decision for the Scottish Government will be when and where rather than whether to roll out hydrogen for heating, as well as industry and transport. There was an associated call for hydrogen-ready boilers to be included in the Strategy as they are no regrets enablers for 100% hydrogen conversion. It was suggested that, at scale, they would cost no more than traditional gas boilers and can also be installed as part of the natural boiler replacement cycle.

There was also a call for strategic decisions regarding hydrogen networks to target low regrets areas. It was suggested that improved qualification of hydrogen zones, and information on how these will be determined, needs to be more transparent. It was also suggested that targeted deployment of heat pumps in mains gas areas could be assessed against a clear zonation of areas unlikely to transition to a mains hydrogen supply in the future.

Others noted conditions which they thought needed to be met for hydrogen to be supported. Views included that:

- The production pathway should be sustainable, for example with hydrogen produced from electrolysis powered by renewables sources or biohydrogen.
- Blue hydrogen may have a role but only where Carbon Capture and Storage (CCS) is used, and the carbon fully captured.
- Hydrogen should be targeted at properties where electrification or already established bioenergy options are not possible or cost-effective.

In terms of particular issues about which clarity was sought, or which respondents thought should inform policy choices, comments included that it will be important to understand the likely cost (p/kWh) of hydrogen or hydrogen blended gas compared to the long-term cost of electricity.

There were also calls for the Strategy and low-regrets policy decisions to act as a driver for further investment in hydrogen demonstration projects and to encourage the adoption and use of critical technologies supporting hydrogen production, transmission, storage and carbon capture. It was suggested that there should be:

- A mandate in force by no later than 2025, which would mean that most homes would have hydrogen-ready appliances by 2040.
- Investment in developing CCS networks.
- Investment in hydrogen production for a widespread conversion of the gas network to take place from 2030, and for hydrogen storage capacity to be expanded at the level of several hundred GWh per year from 2025.

The potential of hydrogen in hybrid heating systems was also raised. Hybrid systems are discussed further below but, in summary, it was suggested that with the peaks and troughs of renewable electricity capacity, hydrogen can provide back-up when wind and solar generation is insufficient, whilst any excess electricity can be used to produce hydrogen.

Hybrid systems

For a number of respondents, from across a broad range of respondent types, there was a connection between hydrogen and hybrid approaches, including agreeing with the consultation paper that it is too early to prioritise deployment of hybrids.

There was a concern that, while hybrid technologies have their appeal, they may involve some residual carbon emissions, will require the continued availability of multiple infrastructures and, from a consumer perspective, will at some point require reinvestment in two heating systems rather than just one. However, potential benefits to the hybrid approach were also noted, including that it could:

- Help avoid the need for electricity grid reinforcement.
- Offer an opportunity for consumers and installers to manage the transition from gas boilers to heat pumps.
- Enable fuel switching through the energy price rebalancing and electric grid capacity development transition. Also, it was reported that hybrids can respond

flexibly and smartly to changing price signals and households could use increasingly popular time of use tariffs.

Some respondents were clear that aspects of hybrid technology should be moved forward, and it was suggested that they offer strategic flexibility in areas on the gas grid, in the vicinity of heavy industry, or where there is uncertainty that hydrogen will be a feasible solution. Hybrid heat pumps, with a heat pump fitted together with a gas boiler (initially natural gas and, in future, hydrogen) were described as a key potential option to decarbonise heating systems.

There was also reference to hybrid solutions involving a bioLPG boiler, and it was reported that such options are already being installed and that the installation is quicker than a whole house retrofit which many rural homes would need before moving over to entirely electric heating. It was suggested that LPG and bioLPG is the perfect partner for hybrid heat pumps in rural areas and there was concern that the approach is being dismissed.

In terms of taking the hybrid approach forward, there were calls for:

- Any new build regulations or standards to allow for, and encourage, the use of hybrid systems, such as heat pumps alongside hydrogen-ready boilers.
- Incentives to support the installation of heat pumps as an upgrade and the installation of the correct controls to optimise the use of each technology for maximum efficiency and minimum carbon output. This could be the best first step for an incumbent combi boiler system.

Heat networks

The fourth strategic technology set out in the consultation paper was the development of low/zero emissions heat networks in areas deemed suitable. A number of respondents, from across a broad range of respondent types, commented on heat networks.

There was support for the inclusion of heat networks as one of the strategic technologies, with reasons given including that:

- It would support the delivery of the statutory targets for reducing fuel poverty without any additional risks from the use of experimental technologies.
- It would also require a bigger focus on other more damaging sectors like transport and agriculture.

In terms of issues that will need to be considered, or challenges that will need to be addressed to enable to successful development of low or zero emissions networks, comments included that there should also be a focus on the further development and expansion of existing networks, and that it needs to be clearer where and why a heat network would be installed.

There were differing views on whether heat networks would increase or decrease energy bills, and it was suggested that there is a need for more systematic evidence on the resource availability and costs of low/zero emissions heat supplies for heat networks in Scotland. It was noted that the forthcoming National Comprehensive

Assessment³ will include an assessment of the potential for heat networks in Scotland and the UK but, in the meantime, it was seen as sensible that the draft Strategy sets out that new heat networks consented from 2023 will need to use heat from low or zero emissions sources. However, there was a note of caution in relation to potential loopholes in the 'consented from' wording which allow consent before 2023 but construction well after this date.

Other comments, including from Housing Association or Academic respondents, focused on viability and the challenges associated with attracting customers. It was suggested that heat network solutions will be largely unviable unless owners agree to participate, but it was noted that compulsory connection has previously been ruled out by the Scottish Government. One view was that significant subsidy will need to be available to encourage participation. It was seen as crucial that development of heat networks dovetails with other aspects of the draft Strategy in order to create sufficient consumer demand. Connected to this it was suggested that:

- Clear communication with consumers and the public at large in relation to innovation and energy developments will be crucial to driving change and is likely to encourage innovation by businesses who may be rewarded with an early return on investment as a result of consumer up-take.
- It would be of particular benefit if communication to consumers included a trajectory of technological developments and regulatory requirements. This will help consumers to be able make informed choices.

Also, while it was acknowledged that the Heat Networks (Scotland) Act 2021 and LHEES will help to drive the best heat decarbonisation solutions in the best places, it was suggested that the Scottish Government should go further and set a decisive end date for gas boiler retrofit to ensure that low/zero emissions heating solutions are installed when existing assets reach the end of their life.

A number of Local Authority respondents were amongst those commenting on wider system issues. It was suggested that the Scottish Government should do more to enable cities and towns to accelerate the construction and uptake of district heating. It was thought that Government support in terms of pump prime funding could be helpful for smaller cities and towns which may not achieve the scale of heat networks needed for financial investment. It was also suggested that:

- Local authorities are ideally placed to take an integrated approach to heat if properly resourced, but a strong partnership with the Scottish Government will also be essential.
- In line with the overall ambition, it is critical that 'heat zones' are identified in off-gas grid areas (through LHEES) as soon as possible, so the best technology (a heat network) is promoted and developed for a given community.
- It will be important to ensure that the mechanisms used to assess new build properties do not unfairly penalise local heat networks. It was suggested that this is currently the case with the EPC Standard Assessment Procedure (SAP).

³ The National Comprehensive Assessment of the potential for heat networks is UK-wide and is expected to be published later in 2021.

- Any future proposals for mandatory heat network connection for large and publicly owned buildings are likely to require significant investment, particularly by local authorities and health boards. Understanding the resource implications should be a priority.

Other technologies

Electric storage heating

A number of respondents, including some Energy Generation, Product Manufacturer and Professional Body (Energy) respondents, referred to electric storage heating. There was some disappointment that there is no commitment to facilitate the installation or upgrading of electric or storage heat systems, including where a heat pump is unsuitable and where power networks can be unstable. There was specific reference to remote rural areas with a fragile power network.

There was reference to smart heat retention electric storage heaters and to the role of efficient electrical heating devices that help to deliver hybrid solutions, including by delivering higher efficiencies and balancing load on the electricity grid. It was suggested that the use of high heat retention storage heaters will be essential in meeting the targets to decarbonise heat and that repurposing existing electric storage heating stock through retrofitting smart charging could reduce carbon, reduce bills and improve heating in up to 250,000 properties.

Bioenergy

The introduction of a Bioenergy Task Force and the intention to develop a new bioenergy plan were welcomed and it was suggested that bioenergy, whether standalone or in a hybrid system, will be crucial for meeting net zero cost-effectively in Scotland. Product Manufacturer and Professional Body (Energy) respondents were amongst those commenting on this issue.

BioLPG: There was support for the recognition that bioLPG can play a role in the future of off-gas grid heat, with further comments including that:

- BioLPG is a versatile, 'drop-in' renewable solution which can provide up to 90% emissions reduction compared to fossil-based LPG. It can be 'dropped-in' to existing supply chains and can be used by consumers in their existing heating appliances, stored in existing bulk tanks and cylinders, and transported using today's infrastructure and skilled workforce.
- A deployment pathway for a full switch from fossil LPG to bioLPG in the UK by 2040 is a feasible solution to support the Government in its ambition to move towards a low carbon economy.
- Hybrid heat pump solutions using bioLPG have also been identified by the Committee on Climate Change as a key technology for decarbonising heat in off-gas grid buildings.
- There are significant opportunities for Scotland to be at heart of the supply chain, with gasification opportunities for sustainable woody biomass and Refuse Derived Fuel.

Renewable liquid fuels: There were comments about the potential of renewable liquid fuels, and it was suggested that some of their key advantages have been overlooked. Advantages cited included that:

- They are the only available option where the gas grid is not available, and the electricity distribution network is not able to meet increased demand.
- With their superior energy density, they can work efficiently in old buildings with solid walls and poor insulation which need high temperatures for heating radiators.
- Thanks to the lower capital investment and running costs, liquid systems are part of the solution against fuel poverty.
- Liquid fuel heating systems can be combined with renewable energy such as solar thermal, photovoltaic, wind or heat pumps.

It was suggested that the remit of the Bioenergy Task Force should be expanded to ensure renewable liquid fuels are viewed as an alternative for off-gas grid homes. There was also a call for the Scottish Government to convene a working group with the liquid fuel distribution industry to put in place a trial of Hydrotreated Vegetable Oil (HVO) in the next winter season.

Biomethane: It was also suggested that biomethane offers a viable and affordable alternative off-gas-grid option, particularly in rural locations. It was reported that it can be produced from locally sourced, rural organic waste materials such as farm manure or cut grass and is zero-carbon, or better than zero-carbon in the case of manures. However, it was also noted that a key challenge is how to access this unused source of zero-carbon energy when the rural production site is small-scale and, as in many rural locations, suffers power grid connectivity constraints preventing biogas processing and/or export as generated electricity.

It was reported that work has been underway to develop a suite of technical solutions and business models that enable the efficient commercially viable off-grid utilisation of these local rural energy resources, in the form of compressed biomethane gas and liquid fuel, for the affordable decarbonisation of space and water heating in homes and buildings.

Secondary technologies

The consultation paper notes that there are also secondary technologies that can work well in conjunction with a primary zero emissions heating system to increase operational effectiveness in certain scenarios. These include micro wind, solar thermal and solar PV generation as well as a variety of storage technologies such as electric batteries, thermal water stores or heat batteries.

A number of respondents, including Consumer Advice, Individual, Local Authority and Third Sector respondents, welcomed the recognition that secondary technologies may have a role to play in supporting the transition to net zero, although there was a concern that classing technologies as secondary places an inherent undervaluation on their potential role in decarbonisation and risks stifling innovation in these sectors.

Nevertheless, the recognition that these technologies could play a role in creating off-grid solutions and supporting grid balancing was appreciated and it was suggested that electrification of heating, at the same time as loading the grid with electric vehicle charging, will mean that measures that mitigate the load on the grid ought to be included at the earliest opportunity. It was reported that technologies such as wastewater heat recovery, solar thermal and PV and can ensure that peak loads are flattened at times when maximum loads are known to occur due to demand for hot water.

Comments about specific technologies included that:

- Thermal batteries in particular will allow for the decoupling of heat production and heat use and provide an element of flexibility to the distribution network. They will also introduce opportunities for users to take advantage of time of use tariffs and help reduce fuel bills.
- Solar thermal is an efficient means of producing hot water with no direct greenhouse gas emissions and can be used at all scales from single domestic buildings to large scale supplies into heat networks. To counteract seasonality issues, it needs a hybrid solution involving other technologies including thermal storage. Solar thermal would work well for island communities that in the summer often rely on oil boilers for hot water and, due to extra sun hours, could easily switch to this technology.
- Geothermal energy encompasses a range of potential sources, temperatures and end uses. There was further reference to the potential of low temperature geothermal energy for space heating and that Scotland has potential for deeper geothermal resources to be utilised for power generation which could contribute to the electrification of heating. It was also reported that mine water geothermal is an emerging innovation, utilising water in flooded mines, upgraded via heat pumps and transmitted through heat networks to customers.
- Water source heat from rivers flowing through urban settlements offers the potential to support large scale heat supply into district heat works and offer the ability to deliver low/zero emissions heat to entire settlements.

It was also suggested that low regrets technologies need to include heat storage such as smaller heat batteries and large-scale heat stores. There was reference to localised thermal storage, particularly in high-density urban environments, most likely taking the form of large-scale units serving several properties.

New Heat Target

The Scottish Government is proposing to set a new Heat Target in the final version of the Strategy.

Question 4 - What function should a new heat target serve?

The number of respondents answering Question 4 is set out below. The 116 respondents, or 65% of all respondents answering this question. Housing Association, Energy Generation and Product Manufacturer respondents were amongst those making longer comments at this question.

Table 6

Question 4: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	5	4%
Consultancy, Training, Assessment or Accreditation	13	7	6%
Consumer Advice, Advocacy or Campaigning	8	5	4%
Energy Generation, Supply or Distribution	20	12	10%
Housing Association	9	7	6%
Individual or Tenant Group	15	11	9%
Local Authority	23	18	16%
Product Manufacturer, Supplier or Installer	19	14	12%
Professional or Representative Body (Energy)	15	11	9%
Professional or Representative Body (Other)	21	11	9%
Public Body	7	5	4%
Third Sector or Non-Governmental Organisation	14	8	7%
Total	178	116	100%
% of all respondents commenting		65%	

A number of respondents, from across a range of respondent types, noted their agreement with the plan to set a new Heat Target, their support for focusing on domestic dwellings, or commented that there should be a distinction between domestic and non-domestic buildings. A small number of Local Authority or Housing Association respondents made this latter point

Further general comments included that any Heat Target should be aspirational or ambitious, whilst realistic and achievable. It was also noted that different solutions to decarbonise heating will be better suited across different areas of the country and that any target would need to be nuanced enough to take account of varied situations and different solutions.

However, a small number of respondents did not agree with the plan to set a Heat Target, with further comments including that it will not provide anything other than an arbitrary target that will be unachievable for the vast majority of the population unless government incentivises industry. It was also suggested that the approach could lead to higher system costs and potentially preclude consumer choice.

Function or focus of any Heat Target

In terms of what a Heat Target should seek to achieve or address, a number of respondents noted that, to be effective, any new Heat Target will need to be holistic and integrate energy affordability and carbon savings, and also emphasise the role

of energy efficiency in reducing heat demand. It should take a whole-system view of the net zero transition and should incorporate both demand and supply measures. Consumer Advice, Third Sector and Housing Association respondents made this point.

In terms of particular outcomes, it was suggested that a Heat Target should aim to:

- Significantly reduce or eradicate carbon emissions from heating and drive action on meeting climate change targets. This was a more frequently made point and was raised by a broad range of respondents. It was suggested that a Heat Target should be aligned with the Climate Change Plan or should be focused on meeting our obligations under the Paris Agreement.⁴ One suggestion was that the Scottish Government could consider replicating the approach taken by the European Union (EU), in which National Climate Plans are submitted to review of whether they are consistent with the EU's climate commitments.
- Support a transition to low/zero emissions heating and encourage the roll out of low/zero emissions technologies. Also, encourage those who may not be able to afford more expensive options to still reduce their carbon footprint by moving onto other low/zero emissions heating solutions.
- Improve energy efficiency and heating efficiency and encourage action to reduce heat demand. Emphasise the role of the fabric first approach in reducing overall energy use and, specifically, advanced fabric measures and/or whole house retrofit. Ensure that from now on all retrofitted buildings are net zero output.
- Support a reduction in, or the elimination of, fuel poverty, including by reducing cost. This was also a frequently made point and was raised by a broad range of respondents. It was noted that a Heat Target offers the opportunity to align with Scotland's Fuel Poverty Targets. However, it was also noted that measures to reduce emissions could, in some circumstances, result in fuel bill increases – it was suggested that both targets can be 'considerate' of each other and that this should be reflected in the wording of the final Heat in Buildings Strategy.

It was also suggested that what qualifies as 'low' or 'zero' emissions should be defined as part of the target setting exercise. However, it was also noted that definitions can be problematic. Examples given were whether biomass boilers, bio-LPG, hydrogen are currently counted as zero emissions.

In terms of what a Heat Target should not do, comments included that it should not remove consumer choice or disadvantage households, particularly vulnerable households and/or those already living in fuel poverty. It was noted that at a local or individual level targets could prove punitive depending on the technology solutions available – so the metrics for compliance need to be carefully considered to prevent undue burden on vulnerable socio-economic groups.

⁴ The Paris Agreement is a legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

Scope of any Heat Target

In terms of the scope and coverage of any Heat Target, suggestions included that it should:

- Set out pathways for long-term decarbonisation of heat, particularly with respect to blue hydrogen, biofuels and fossil-fuel based heat networks.
- Serve as a driver for change for a range of stakeholders across Scotland and an incentive to provide consistent and appropriate support for individuals, organisations and communities to make the changes necessary to transition to a net zero society. It should help align and encourage collaborative working across the public, private and third sector.
- Specify strategic outcomes and allow industry to identify the most efficient and cost effective way of delivering those outcomes at the site level. A similar perspective was that while in general terms it is preferable to specify non-technology specific policy targets (outcomes rather than means), there may be some circumstances in which technology specific support is necessary.
- Act as a mandatory driver to ensure housing developers, public bodies and other organisations do not avoid the requirement to decarbonise heat supplies and so greatly improve energy efficiency of assets and infrastructure.
- Provide a pathway for installing effective carbon reduction measures in housing and, by so doing, avoid inadequate and/or costly installations. It should provide standards for the design of new and replacement heating systems, insulation and ventilation and should describe and regulate the systems and installation options for energy required for space heating available under any relevant methods of application.
- Provide industry, including the wider supply chain, with increased confidence and certainty regarding how the market will develop. It should be developed in collaboration with key supply chain partners and energy infrastructure providers. This was a frequently made suggestion and was most likely to have been highlighted by Product Manufacturer respondents.
- Provide a visible pipeline of activity for the sector and its supply chain. It was suggested that setting clear targets could help stimulate investment, including across the wider supply chain
- Provide investors and consumers, including businesses, organisations, homeowners and landlords with greater certainty about the future direction of heat supply. This was also a frequently made suggestion and was raised by a broad range of respondents.
- Promote buy-in from consumers and increase the public's understanding around how usage of a building impacts on emissions.

Property type remit of a Heat Target

It was suggested that the end goal should reflect an analysis of the stock with heat demand brought to exemplar levels and that 'end goal' heat demand levels could be adjusted to the types of building and constraints, for example by recognising heritage buildings.

With reference to the properties to be 'targeted' for action, there was a call for clarity in relation to the makeup of the million homes to be converted to a low/zero emissions heating system⁵. It was suggested that a more granular analysis will make planning and implementing actions against the target much easier. In addition, there need to be interim targets so progress towards the million homes target can be tracked.

In terms of types of buildings, comments included that the Heat Target should:

- Drive adoption of low/zero emissions heating in existing homes. It was suggested that a robust benchmarking programme across various building types would be beneficial.
- Mandate improvements to the poorest performing existing buildings either with the highest energy use per m² or with poor EPC ratings. It was suggested that if only point of sale or change of tenancy is used, insufficient progress will be made, and that actual energy billing data should be used to determine the worst performing buildings.
- Provide an alternative standard for homes which cannot be practically or affordably retrofitted to efficiently run a heat pump.
- Be suitable and achievable for rural homes and businesses, as well as those off the gas grid.

On this latter issue, it was recommended that there are separate targets for on-gas and off-gas grid properties as the issues facing each property type are different.

Strategic fit and measurability

In relation to measuring progress towards meeting any Heat Target, comments included that it should:

- Create transparency and accountability, which in turn should make the target more attainable.
- Be based on a fully developed framework for the new Strategy.
- Provide a framework for policy development, ensuring consistency whilst driving change.
- Inform planning regulations or be integrated into and implemented by new Building Regulations.

Other comments addressed issues of measurability and included that setting a target provides a clear framework and benchmark against which to measure progress and will allow best practice to be identified and shared. It was also seen as important that the Scottish Government regularly reviews progress and alters their strategy if it is not delivering the progress required.

⁵ The consultation paper (p.3) states that '*...we must rapidly scale up deployment of zero emissions heating systems, such as heat pumps and heat networks, more than doubling installations each year so that by 2030 over 1 million homes and around 50,000 non-domestic buildings are converted to use these systems.*'

Further points raised were that:

- The Heat Target should be an outcomes-based standard which allows clear, measurable progress to be demonstrated. It should provide Parliament and the Scottish People with a benchmark to assess progress to achieving net zero and reducing/eliminating fuel poverty.
- The Scottish Government's fuel poverty reduction targets should form the baseline of measurement of any Heat in Buildings Strategy.
- A baseline, and intermediate/interim and end point targets, should be set. It was suggested that interim steps will allow the Scottish Government to track progress closely, and act as a catalyst if shortfalls are apparent, allowing for the realignment of support, finance and investment.
- It should track directly to net zero.
- Progress should be measured in terms of thermal output for comparison with the baseline, with sub-targets for domestic and non-domestic buildings and specific technologies.

It was reported that a challenge to tracking and monitoring a heat target could be that energy for heat is not currently metered separately from other energy uses in the home, such as charging. It was suggested that as the electrification of heat progresses at scale, it will be necessary to separate out electricity used for heating from general domestic use.

A further comment was that, when designing the reporting regime, data fishing and collection through the existing Heat Network reporting to The Department for Business, Energy and Industrial Strategy (BEIS) is not necessarily a model to replicate since there is a risk only those heat production systems that are declared will be captured.

Possible options for a Heat Target

Other comments addressed one or more of the possible options for a new Heat Target set out within the consultation paper. These are covered in turn below.

However, a general point made was that different audiences will have different requirements of a target. For example, it was suggested that feedback from industry is that technology-specific targets are most helpful, as otherwise the role of a particular solution within a generalised carbon or heat target is lost and thereby dilutes the positive effect that targets can have on market and investor sentiment. Conversely, a simple and easily understood target is needed to communicate to the public and for tracking progress against climate targets.

Designed as a roll-over of the existing target, which measures renewable heat

Concerns about taking this approach included that:

- It carries a risk that heating systems might be replaced without proper consideration of local constraints. For example, a new electric system might be installed where it is not cost-effective, with a risk of increasing fuel poverty.
- The current target is too favourable to biomass.

- It penalises any heat generation that is electrical or that is considered untested.

Other comments relating to the current approach included that there are significant issues that need to be addressed with EPCs, and that any new Heat Target will need to take account of proposed changes and the introduction of additional indicators. This issue is covered in greater depth in Chapter 8 (Question 48-51).

Include setting a target based on the proportion of heat demand delivered by low and zero greenhouse gas emissions technologies

Most of those who stated a preference for one of the three options set out favoured this option. Those favouring this approach came from a range of respondent groups, but from Consultancy or Local Authority respondents in particular. Reasons given for favouring this option included that:

- Whilst the Renewable Heat Target used previously was useful, it also drove growth in technologies perhaps not important to the long-term strategy for heat. Renewing the target with a specific focus on the newly-formed strategic technologies will ensure that the end result of a new target will be aligned with wider strategic priorities.
- It should enable us to understand the progress that has been made and what should be addressed next.
- Using the metric of building emissions as an overarching measure will maximise flexibility between demand and supply side measures and aligns with the no/low regret principle that is to characterise the Strategy.

However, a small number of respondents did raise concerns about this option. These included that it is likely to result in unintended consequences, such as promoting a move to retrofit Mechanical Ventilation with Heat Recovery systems, which would be destructive, costly and likely inefficient in many traditional buildings, simply because the energy they use is not counted as heat demand.

Focus on deployment rates for particular technologies, or on numbers of high emissions heating systems that need to be replaced

A small number of respondents noted their support for an approach based on clear deployment targets for new technologies, and/or for monitoring the number of 'outstanding' replacements.

Concerns about taking this approach included that:

- As with Option 1, it carries a risk that heating systems might be replaced without proper consideration of local constraints.

Alternative approaches

Specific alternative or further suggestions for the framing of a Heat Target included that it should be:

- Based on affordability or the cost of heating an actual home in use.
- Balanced between deployment of alternative heating technologies as a way of measuring progress toward the 2030 and 2040 targets, and generation and utility network resilience and availability.

- Matched to a building's capacity to meet it.

Question 5 - How do you think a new heat target should account for the need to deliver against our statutory fuel poverty targets?

The number of respondents answering Question 5 is set out below, with 96 respondents, or 54% of all respondents answering. Product Manufacturers and Professional Body (Energy) respondents were amongst those making more extensive comments.

Table 7

Question 5: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	4	4%
Consultancy, Training, Assessment or Accreditation	13	5	5%
Consumer Advice, Advocacy or Campaigning	8	4	4%
Energy Generation, Supply or Distribution	20	11	11%
Housing Association	9	5	5%
Individual or Tenant Group	15	12	13%
Local Authority	23	15	16%
Product Manufacturer, Supplier or Installer	19	12	13%
Professional or Representative Body (Energy)	15	10	10%
Professional or Representative Body (Other)	21	6	6%
Public Body	7	5	5%
Third Sector or Non-Governmental Organisation	14	6	6%
Total	178	96	100%
% of all respondents commenting		54%	

A common theme, and one raised by a broad range of respondent types, was that tackling fuel poverty should remain a priority, and that efforts to meet heat or decarbonisation targets should aim to support rather than impede its eradication. This was sometimes referred to as ensuring there is a just and fair transition to zero carbon and there was also reference to the *Just Transition Commission: A National Mission for a fairer, greener Scotland* report.⁶ It was noted that the report highlights that:

⁶ Available at: <https://www.gov.scot/publications/transition-commission-national-mission-fairer-greener-scotland/>

- Heating costs vary, but in general it is currently more expensive to run a low/zero emissions heating system than alternatives such as gas boilers.
- Rural and island communities are especially vulnerable to changes to the cost of heating due to the prevalence of housing stock with poor energy efficiency in these areas, combined with limited choice of feasible heating systems.

Respondents suggested that any new Heat Target has to do more than avoid making the problem worse; a new target, and associated strategy, has to actively support actions to reduce fuel poverty, while at the same time reducing carbon emissions. Fuel poverty targets should be built in, not bolted on to the new Heat Target. Consumer Advice and Housing Association respondents were amongst those making these points.

It was seen as important to understand the intrinsic link between fuel poverty and heating, and then consider its implications not only when designing a new Heat Target, but also when considering how it will be delivered and how progress will be assessed. Suggestions around how the focus on fuel poverty can be ensured included:

- The Scottish Government's fuel poverty reduction targets should form the baseline of measurement of any Heat in Buildings Strategy.
- Fuel Poverty Targets should be inclusive of the Heat Target.
- Adding a metric as to how action directed towards the new Heat Target is also addressing fuel poverty across populations.
- Legal enforcement through standards development, embedding these concerns across legislation.
- Areas in high levels of fuel poverty should be those that are tackled first. These are the areas which will require the greatest levels of public sector intervention to be taken forward, but which can make a wider contribution to the principles of a fairer, greener, healthier and more inclusive Scotland.

It was also noted that, at this time, Scotland does not have the Fuel Poverty Strategy that would provide the context for all other related strategies and other Government interventions. There was a call for the new Fuel Poverty Strategy to be published as a matter of urgency.

Demand for heat

Respondents highlighted the importance of reducing demand for heat and suggested that the Heat Target could make provision for a certain amount of demand side measures. It was noted that these are generally cost saving to the consumer, and hence could offset supply side measures - which are cost incurring - to some degree.

As at other questions, there was a focus on the importance of emphasising and prioritising a fabric first approach for domestic properties. It was reported that this approach will not only make the heating system operate more efficiently but will also deliver long-term energy demand reductions, fuel bill savings and make homes warmer, directly tackling fuel poverty and supporting Scotland's decarbonisation efforts.

Supply of heat

Other comments related to the supply side and included that there will need to be support for those least able to pay and protections for who are most vulnerable from any increase in costs arising from the transition to net zero. It was suggested that there is a risk that, in the drive to meet targets, the technology deployed costs more to run than existing systems. This was said to be a particular risk when households move away from gas or oil fuelled heating systems.

A number of other comments also reflected themes at other questions around considering the installation and operation costs of different types of heating system and how these differences will impact on consumers. It was also reported that while a revision to the EPC metric giving more weight to carbon emissions savings as opposed to purely cost would be helpful in relation to a Heat Target, there could be fuel poverty concerns if the cost-based metric is disregarded completely.

In terms of specific measures or actions that could help reduce the likelihood or mitigate the impact of supply side cost increases, comments tended to focus on the energy market and taxation arrangements and support programmes or initiatives. These issues are covered in turn below.

The energy market and the taxation regime

A number of respondents, from across a broad range of respondent types, referred to the energy market, with general comments including that wider energy market reforms are needed and that the Scottish Government should seek to ensure the best deal for Scottish consumers.

It was also suggested that the tax regime applied to energy supplies is misaligned. Specifically, it was reported that the relative taxation rates and prices for electricity and gas do not reflect the emissions of each fuel, with the current environmental and social levies placed on electricity creating perverse incentives that do not encourage switching to lower carbon alternatives.

Recognising that this is not a devolved issue, there was a call for the Scottish Government to continue their efforts to get the UK Government to address this issue. Key to the required changes would be to:

- End support and reduced taxation rates for fossil fuels; and
- Shift policy costs away from electricity as the lowest carbon 'fuel'. It was reported that many of the policy costs associated with carbon emission reduction are placed on electricity prices and that there have been calls from energy suppliers and the wider energy industry for this to be rebalanced.

On this latter point, it was suggested that this should be done in a way that avoids raising dual fuel bills or increasing energy bills – for instance, by avoiding levies on heating and transferring electricity policy costs to the exchequer. One suggestion was to redistribute any revenue raised towards supporting low income and/or fuel

poor households and it was reported that this is an option explored within a recent paper on the Distributional Impacts of a Carbon Tax in the UK.⁷

Also in relation to direct costs to consumers, comments included that:

- The unit cost of electricity is higher in the Islands as compared to mainland Scotland. This is despite some areas, such as the Orkney Islands, being self-sufficient in renewable electricity. One possible option would be for a local tariff for the use of locally generated electricity.
- It will be important that mechanisms to avoid price increases are included in the regulatory and support mechanisms that are developed to achieve the Heat Target.

Support programmes and initiatives

Respondents also identified a range of other policy approaches or initiatives which have the potential to protect households, and particularly vulnerable households, from increased supply costs. Consumer Advice, Local Authority and Product Manufacturer respondents were amongst those commenting.

It was suggested that Scotland should not shy away from driving fuel efficiency at every opportunity and that if this increases cost then a mechanism for recompense needs to be introduced. Other comments included that

- Financial support should be offered to enable fuel poor households to switch to low/zero emissions alternatives. There was reference to promoting uptake of green technology through grants, subsidies or loans and to grants for the retrofit process being essential. There was a call for the expansion of the Energy Efficient Scotland Programme.
- Providing extra support and resources for consumers, such as help with switching tariffs or help with understanding how to get the most out of new heating systems. These resources should be focused on those living in or at risk of fuel poverty.

It was also reported that the UK Government's fuel poverty schemes are shifting towards a multiple measure approach where structural issues, the building fabric and heating system are all upgraded simultaneously. It was suggested that such an approach minimises the overall number of interventions in the home and can help to address one of the root causes of fuel poverty.

Finally, although for most respondents the focus was on moving away from gas fuelled heating, it was reported that Scottish Government funding for central heating systems has enabled over 20,000 fuel poor customers in Scotland to benefit from free connections to the gas network since 2013, and to access to what is currently and typically the cheapest heating fuel. It was suggested that the proposed changes will remove one of the most effective levers to deliver against fuel poverty targets and the option of hydrogen heating in future.

⁷ Available at: <https://www.lse.ac.uk/granthaminstitute/publication/distributional-impacts-of-a-carbon-tax-in-the-uk/>

Monitoring and reporting

It was argued that progress towards meeting the Heat Target should be measured against fuel poverty numbers looking, for example, at whether the number of households in fuel poverty is increasing or decreasing as a result of new technologies.

Other suggestions included:

- Robust monitoring of the impact of any programmes on the ground in terms of low/zero emissions heating and energy costs.
- Using Data Zones to allow spatial analysis at a small area unit level. It would then be possible to report on the percentage of current heat demand being met by low/zero emissions heat sources in areas where fuel poverty is considered 'high'.

Targets should not be linked

Whilst most of those commenting agreed there should be a direct link between a Heat Target and Fuel Poverty targets, not all thought this should be the case. Housing Association and Community Council respondents were amongst those who did not think there should be a direct link.

One concern was that to link the two targets and use heat decarbonisation as a proxy for fuel poverty reduction overlooks the complexities of the relationship between the two and risks undermining of both targets. An associated recommendation was that the targets are addressed separately but with reference to each other.

Another suggestion was that the Scottish Government should commit to ensuring that delivery against the new Heat Target is compatible with the Fuel Poverty Target, with measures built into policies and schemes to ensure that conversion does not lead to increased heating costs and a higher risk of fuel poverty.

Question 6 - Do you agree that a new heat target should apply to heat in buildings, distinct from industrial heat?

Responses at Question 6 by respondent type are set out in Table 8 below.

Table 8

Question 6 - Do you agree that a new heat target should apply to heat in buildings, distinct from industrial heat?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	1	0	1
Community Council, Trust or Group	4	1	5
Consultancy, Training, Assessment or Accreditation	4	1	5
Consumer Advice, Advocacy or Campaigning	5	0	5
Energy Generation, Supply or Distribution	11	1	12
Housing Association	6	0	6
Individual or Tenant Group	8	3	11
Local Authority	14	1	15
Product Manufacturer, Supplier or Installer	10	2	12
Professional or Representative Bodies (Energy)	8	0	8
Professional or Representative Bodies (Other)	5	1	6
Public Body	4	0	4
Third Sector or Non-Governmental Organisation	7	0	7
Total	87	10	97
Total %	90%	10%	

Among respondents who answered the closed question, a clear majority – 90% – agreed that a new Heat Target should apply to heat in buildings, distinct from industrial heat, while 10% disagreed.

The number of respondents making a further comment at Question 6 is set out below, with 78 respondents, or 44% of all respondents commenting. Local Authority respondents were particularly likely to have made a further comment.

Table 9

Question 6: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	3%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	3	4%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	10	13%
Housing Association	9	5	6%
Individual or Tenant Group	15	7	9%
Local Authority	23	14	18%
Product Manufacturer, Supplier or Installer	19	9	12%
Professional or Representative Body (Energy)	15	8	10%
Professional or Representative Body (Other)	21	5	6%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	6	8%
Total	178	78	100%
% of all respondents commenting		44%	

Reasons given for agreeing that a new Heat Target should apply to heat in buildings, distinct from industrial heat included that:

- Industrial heat can cloud the statistics, hiding important trends in the wider building stock. Applying a separate target for heat in buildings will enable emissions from buildings to be better assessed and monitored.
- The drivers of demand are very different between domestic and non-domestic usage and different incentives will be required in order to achieve the desired outcomes – both for consumers of heat and for the overall net zero project.
- The pathway for decarbonising industrial heat will be very different to decarbonising that from homes, especially as industrial heat is more reliant on technologies such as Combined Heat and Power, CCS and Hydrogen.
- Industrial heat must compete internationally and if targets are set too high businesses could relocate elsewhere in the UK, Europe or the world, taking their high CO₂ emissions with them as well their jobs.

Additional comments included that it is still important that industrial heat is considered and a broad range of respondents called for a separate strategy to reduce industrial heat, with decarbonisation targets and appropriate monitoring in place. It was also argued that heat from industry needs to be considered as a

potential source of heat for heat networks and fuel supplies, such as hydrogen. It was suggested there is a need for system level thinking, given that solutions like hydrogen can have a role in decarbonising heat across domestic and industrial sectors as well as other sectors like transport.

Those who disagreed and went on to make a comment tended to raise similar issues. It was suggested that heat in buildings must work in tandem with industrial heat demands. Further suggestions included that the potential for synergic heating and storage should be investigated and synergies between industrial sites and residential communities in terms of waste heating and cooling need to be explored.

It was also suggested that industrial heat will deliver greater emissions reductions per installation so a greater focus on this early in the pathway will ensure targets can be met more quickly.

Question 7 - What form should a new heat target take and why?

The number of respondents answering Question 7 is set out below, with 80 respondents, or 45% of all respondents answering. Product Manufacturers and Professional Body (Energy) respondents were amongst those making more extensive comments.

Table 10

Question 7: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	4	5%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	9	11%
Housing Association	9	5	6%
Individual or Tenant Group	15	8	10%
Local Authority	23	16	20%
Product Manufacturer, Supplier or Installer	19	10	13%
Professional or Representative Body (Energy)	15	7	9%
Professional or Representative Body (Other)	21	4	5%
Public Body	7	2	3%
Third Sector or Non-Governmental Organisation	14	7	9%
Total	178	80	100%
% of all respondents commenting		45%	

Some of the comments referred to the three possible options set out in the consultation paper. Very much in line with the analysis at Question 4, those who commented generally favoured a target based on low and zero greenhouse gas emissions technologies. They included Housing Association, Energy Generation and Product Manufacturer respondents. Reasons given included that this approach allows for the no regrets solutions of today, whilst also allowing the market to be left open for technology innovation. Other comments raised a similar theme – that the Heat Target needs to concentrate on technology that is available now and which can be implemented with the least disruption and cost.

However, there was also some support for the current form of the Heat Target or for focusing the target on deployment rates for particular technologies, or on numbers of high emissions heating systems that need to be replaced. Local Authority and Third Sector respondents were amongst those taking this view. One perspective was that this would be the simplest solution and allow factors affecting deployment to be accounted for down to individual buildings. It was also suggested that the deployment rate of a particular technology or technologies would link directly to the targets for numbers of buildings converted by 2030 and 2045 that are included in the draft Strategy and would also align well with the LHEES approach.

One suggestion was that it would be helpful to provide researched scenarios from academics and industry leaders, of different heat target forms and application as well as running some workshops and consultations with relevant stakeholders to test its usefulness.

In other general comments simplicity was described as key and it was suggested that there should be an overarching target which is easy to understand, with sub-targets set to address specific challenges. Respondents also identified possible outcomes, outputs or indicators for a Heat Target, with some noting that multiple indicators are likely to be needed. For example, it was reported that the source of the energy for providing heat to a building is not the only relevant factor, as capability to reduce demand will also influence the most appropriate choice of energy source on a building specific basis.

Specific suggestions were many and varied but included:

- Total emissions from heat (TCO₂). This was described as the ultimate measure of success with an overall target of zero. It was also suggested that the target should be tied to emissions to allow for the use of devolved powers relating to air quality.
- Total heat used, emissions from heat and heat relative to floor area of buildings.
- Total heat consumption (kWh). It was suggested that, even if zero emissions is achieved, this is a measure of efficiency and becomes an indicator of effectiveness of application.
- The overall proportion of building heat that comes from low/zero emissions sources. As a subset, the heat provided via common carriage over electricity and gas networks.

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- An increase in renewable heat capacity and generation (within an overall decline in heat demand).
- Reduced heat demand per property as a result of energy efficiency measures. It was suggested that this could be based on SAP ratings.
- A decrease in the number and proportion of households in fuel poverty.
- The number of properties utilising one of the strategic technologies as a percentage of the total number of properties. Further suggestions included clear targets - not ambitions - related to the roll out of no and low regret technologies. It was suggested that these need to be specific, so that the bottom-up planning carried out in the LHEES can be compared against them to deliver an early indicator for necessary policy adjustments.

Technology-specific targets that illustrate the potential contribution of key technologies to the overall target were also suggested. Comments included that these could:

- Be presented in terms of the number of buildings to which they applied, or as a set of specific fabric energy efficiency targets for different types of buildings set out in kWh/(m²*a) of useful heat required to heat buildings.
- Reference the carbon intensity of the technology, e.g. kgCO₂/kWh, to provide a clear and transparent approach.

It was suggested that technology-specific targets would have the additional benefit of giving the supply chain sufficient certainty and thus confidence to invest in the expansion required.

There were also suggestions for other output-focused indicators of a type that could be used to drive progress, and which might be targeted at the programme level. Suggestions included:

- The number of buildings or technology installs per year, for example installation of insulation measures or low/zero emissions heating systems. It was reported that local authorities tend to work in terms of building installs and will target a number of buildings/technology installs and that deployment rates are easier to measure and report against at a local level compared to heat demand, which is typically benchmarked at a national level.
- The likely number of properties which would fit the profile for heat pumps, hydrogen or heat networks.
- The percentage of heat once delivered by non-renewable sources of heat such as heating oil, mains gas or solid fuels, now delivered by electrification or biomass.
- Thermal output of heat networks – new, and existing. A further comment was that heat networks that are powered by natural gas should not be included at this stage.
- The percentage of green gas in the gas grid.

General observations about how any progress against targets should be recorded and analysed included that:

- A distinction should be made based on:
 - Whether domestic or non-domestic.
 - Tenure.
 - Type of property/housing stock.
 - Location.
 - Whether on or off-gas grid.
 - Fuel type or type of system generating heat.
- The amount of renewable heat used by new buildings as they come online should be captured.
- Information should be disaggregated to local authority level to simplify monitoring of LHEES delivery.

Question 8 - At what level should the target(s) be set and for what date?

The number of respondents answering Question 8 is set out below, with 86 respondents, or 48% of all respondents answering.

Table 11

Question 8: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	3	3%
Consultancy, Training, Assessment or Accreditation	13	5	6%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	11	13%
Housing Association	9	5	6%
Individual or Tenant Group	15	11	13%
Local Authority	23	16	19%
Product Manufacturer, Supplier or Installer	19	9	10%
Professional or Representative Body (Energy)	15	7	8%
Professional or Representative Body (Other)	21	1	1%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	8	9%
Total	178	86	100%
% of all respondents commenting		48%	

In relation to how, or by whom, a target and dates should be set, comments included that until deliverability of the technical solutions is known, it is difficult to set target levels and dates. It was suggested that any new targets should be set on the basis they are known to be deliverable. Other comments or suggestions were that:

- Targets should be advised by a panel of experts such as the Committee on Climate Change⁸, using modelling of the different paths possible.
- A range of potential targets should be formally assessed via a Strategic Environmental Assessment.
- At a national level, the total energy required to meet that demand should reflect that expected to be available by 2045 from zero carbon sources.
- The data is currently not up to standard to full inform targets and dates. A mass data gathering exercise is essential.

In terms of key requirements of any targets, comments included that:

- They should account of both “bottom up” meeting “top down” approaches, in a similar way as used by the London Energy Transformation Initiative to develop total energy use intensity targets for new buildings.
- They should be flexible enough to account for geographical differences, or set at both local as well as national level. However, an alternative perspective was that regional targets could result in added complexity for little added benefit.
- There should be non-domestic as well as but separate from domestic buildings targets.
- Include provisions for change in response to unintended outcomes and be updated as the technology landscape develops.
- Supported by SMART objectives.

There was also a call for the initial target and subsequent interim targets to be announced as early as possible to encourage early adoption of low/zero emissions heating systems and also enable industry to prepare for the increased demand including upskilling the installer base.

A number of respondents referred to the importance of achieving net zero by 2045 of setting targets and timescales that allow us to meet that commitment. This included reference to Scotland's Climate Change Plan.⁹ This was the most frequently raised issue at this question and was highlighted by a broad range of respondent types.

A connection was also made to the Energy Efficient Scotland: route map¹⁰ and the targets and dates set out therein. The interim heat target of 50% of heat in all buildings produced by low/zero emissions technologies by 2030 was described as acting as a significant milestone of progress to 2045. It was also noted that with non-

⁸ The Committee on Climate Change advises the UK Government on emissions targets and reports to the UK Parliament on progress made in reducing greenhouse gas emissions.

⁹ Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/>

¹⁰ Available at: <https://www.gov.scot/publications/energy-efficient-scotland-route-map/>

domestic buildings having already achieved this milestone, this target would also align both building types.

The importance of Heat Target being aligned with other targets and timescales set out within the wider Heat in Buildings Strategy was also noted. There was also reference to the importance of aligning with other relevant Scottish or UK strategic or policy commitments, with specific suggestions including the UK's Sixth Carbon Budget¹¹.

In terms of legislation standards or regulations, it was suggested that any Heat Target should work in conjunction with or reflect:

- Reflecting themes raised earlier, the targets should be comparable and run-in tandem to the Fuel Poverty (Target, Definition and Strategy) (Scotland) Act 2019, with the caveat of aligning to extreme fuel poverty targets.
- EPC or EESSH standards.
- The Net Zero Carbon Public Buildings Standard.
- Equivalent to Passivhaus standards as a minimum.

There was also reference to various other timeframes which could be of relevance including that:

- The next electricity distribution price control period, RIIO-ED2, will run from 2023-2028.¹² It was suggested that this provides an opportunity to align a new heat target with the pricing and investments periods for the distribution of electricity.

There was clear support for the use of staged, interim or incremental targets, with specific suggestions for the appropriate timeframe for increments or timescales for milestones or targets including:

- Working to 5 year increments. Third Sector, Professional Body (Energy) and Public Body respondents were amongst those suggesting this approach.
- Having annual milestones or targets. Community Council, Professional Body (Energy) and Public Body respondents were amongst those who thought annual milestones have a role to play.

It was also suggested that there should be more interim targets than currently proposed, and that such an approach would strengthen accountability and enable the target to be revised to adjust to changes in the technology available, or Scotland's emissions targets.

Other suggestions included that increments could be greater in the latter stages, once deployment and supply chains have become more established. However, an alternative perspective was that targets should be front loaded and as ambitious as

11 Available at: <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

12 Information can be found at: <https://www.ofgem.gov.uk/regulating-energy-networks/2023-price-control-review-riio-ed2>

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possible in the short term, allowing greater headroom and certainty of hitting the long-term goals than a progressive approach that requires more to be done later.

Chapter 3: People

The consultation paper notes that transforming how homes and buildings are heated will touch the lives of almost everyone in Scotland and that people must be at the heart of this transition. A just transition to net zero will mean working with people, businesses and communities across Scotland to ensure they have a clear role in decision making and can access support and advice, to help ensure that the burden of paying for the transition is spread fairly.

Taking people with us

Building on the Climate Change Public Engagement Strategy, it is intended that a bespoke public engagement strategy for heat in buildings will focus on:

- Raising the profile of energy efficiency and zero emissions heating options, so that people are aware of the benefits and begin to see them as a positive choice.
- Enabling people to participate in shaping the development of Scottish Government policy and incentives as well as local level heat and energy efficiency planning.
- Promoting the support that is on offer from both the Scottish and UK Governments to maximise take up over the 5 years of the Strategy.

To support public engagement, branding will be simplified to make schemes easier to identify and navigate, helping to build trust and awareness. Disengaged and vulnerable groups will be supported and engaged, ensuring that support does not discriminate based on any protected characteristics.

Question 9 - What are the most significant actions we can take to ensure that Scotland's people and organisations are meaningfully engaged in the net zero heat transition?

The number of respondents answering Question 9 is set out below, with 122 respondents, or 69% of all respondents answering. Consumer Advice, Third Sector and Local Authority respondents were amongst those making more extensive comments.

Table 12

Question 9: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	3	2%
Community Council, Trust or Group	6	6	5%
Consultancy, Training, Assessment or Accreditation	13	8	7%
Consumer Advice, Advocacy or Campaigning	8	6	5%
Energy Generation, Supply or Distribution	20	12	10%
Housing Association	9	7	6%
Individual or Tenant Group	15	10	8%
Local Authority	23	18	15%
Product Manufacturer, Supplier or Installer	19	12	10%
Professional or Representative Body (Energy)	15	9	7%
Professional or Representative Body (Other)	21	17	14%
Public Body	7	5	4%
Third Sector or Non-Governmental Organisation	14	9	7%
Total	178	122	100%
% of all respondents commenting		69%	

A broad range of respondents offered support for the approach to a public engagement strategy and the need to achieve public buy-in to the transition to net zero heat. It was suggested to be important to focus on:

- Environmental benefits.
- Economic benefits, including lower fuel bills and local job creation.
- Energy security.
- Health benefits from warmer homes or from improved air quality.
- Action on fuel poverty and a just transition.

The importance of tailored communication was highlighted, including by Consumer Advice and Local Authority respondents. It was noted that individual motivations for making changes will differ, as will the factors influencing communities in different parts of the country. Public concerns regarding cost of new technologies were also highlighted and the need to provide incentives was often referenced, with a suggestion that, in addition to a focus on fuel poor and low-income households, there should be help based on the type of building and that the 'able to pay' sector will also require support.

Early and sustained engagement

A number of respondents from across a broad range of respondent types highlighted the importance of both early engagement and engagement activity sustained over a long period. Early engagement activity was suggested to be important if targets are to be achieved and to let people know that their next heating system is unlikely to be the same as their existing one, creating an expectation of change that may lead to switching before old systems break down. General comments on communication included that it should be clear, easy to understand and consistent, and should consider how to target hard-to-reach groups.

Respondents also suggested the need to:

- Explain the requirement for action with respect to heat in buildings in the context of the climate emergency and emphasise that this is a shared challenge.
- Instil belief that the solutions are of direct benefit to households.
- Ensure that the actions needed are clearly and precisely communicated.
- Explain the obligations on building owners and the regulatory requirements.
- Highlight the advice and support that are available.

The intention to deliver simplified branding for schemes was welcomed, although it was also suggested this should be fast tracked. However, careful use of Scottish Government branding was also urged to avoid any potential for confusion or mixed messages.

How to engage

General comments included that communication should be high profile and should be carried out at both national and local levels. The opportunity to learn from public engagement during the COVID pandemic was also suggested, as was taking any opportunities for engagement arising from the UN Climate Change Conference (COP26) in Glasgow.

In terms of the methods that might be employed, it was argued there must be a multi-channel approach that includes traditional forms of communication. Specific suggestions included:

- TV and radio. This was the most frequently made suggestion.
- Social media.
- Leaflets.
- Mail to households.
- Information in public buildings, such as GP surgeries and libraries.
- Information with utility bills or council tax statements.
- Outreach activities, such as workshops.
- Education in schools.
- Via heating system engineers at point of servicing.
- Via EPCs.

- The public sector leading the way, with practical examples of what can be achieved, for example in public buildings.

Respondents from across a broad range of respondent types emphasised the importance of communities and of local engagement, including via community organisations, social landlords and local advice services. There was a suggestion such organisations should be provided with resources for the purpose and the importance of engagement programmes that enable communities to influence decision-making were highlighted.

Other suggestions with respect to community engagement included ensuring local people benefit, for example by making the public and local communities co-investors in heat networks or via large-scale, community led bulk procurement and retrofitting schemes.

Important communication roles for local authorities were suggested and the potential to use existing engagement channels associated with production of Local Place Plans (LPPs) and Local Development Plans (LDPs) was highlighted. The potential for authorities to work in partnership with social landlords was also suggested, as was a role for tenant groups in taking the Strategy forward.

In terms of engagement with the business community, the need to provide timely and appropriate information to raise awareness and build capacity was suggested and that this could be achieved via trade associations and professional groups but also should be extended beyond these to broaden and deepen reach. Community Council, Local Authority and Professional Body (Other) respondents were amongst those highlighting these issues.

The need to develop a robust supply chain with appropriate skills for work on all buildings, including those of traditional construction was highlighted. Also with respect to training provision it was seen as important to include advocacy and engagement skills to enable heating professionals to discuss the benefits of low and zero emissions systems with customers.

Providing further information, advice and support

Looking beyond initial engagement, respondents also highlighted the need to provide further information and support to help people and businesses make informed choices. The importance of consumer access to advice services such as Home Energy Scotland was referenced, with suggestions that the capacity of services should be scaled up and public awareness of services should be improved. In terms of the information and advice required suggestions included that there should be:

- Impartial advice/assistance.
- Detailed, transparent information on the options available and that this should be distinct from the marketing materials produced by product manufacturers.
- Advice should stress the greater benefits achievable by combining key elements.

- Education/support on the best use of new systems. This was a frequently raised issue and was highlighted by a range of respondent types. A risk of negative publicity if new owners experience high fuel bills and potential fuel poverty due to lack of awareness and understanding of the correct way to operate their new heating system was highlighted.

Some other suggestions related to providing opportunities for people to explore new technologies. For example:

- Centres of Excellence which would serve as training centres for renewable heat installers and could also provide opportunities for experience, engagement and learning for the general public.
- Interactive tools such as Digital Twins could be used to convey practical benefits to daily lives.

Current trials exploring the barriers to heat pump and hydrogen technologies in existing homes were highlighted, and it was suggested these should provide a framework of common questions, problems, and solutions for installation that could be used to develop actions for overcoming problems that may arise. It was also recommended that the Scottish Government should support large-scale field trials of low/zero emissions heating technologies, in particular those technologies where there is no solid dataset for performance across different building types and weather conditions.

The need to build consumer confidence was also seen as important, requiring a robust remit for consumer advice services and support on standards/redress for consumers. Consumer protection is discussed further at Questions 16 and 17 below.

Question 10 - What in your view are the opportunities, if any, available to key organisations, such as local government, businesses and trade associations and community or other non-government organisations, in supporting this public engagement activity?

The number of respondents answering Question 10 is set out below, with 108 respondents, or 61% of all respondents answering. Consumer Advice, Product Manufacturer and Professional Body (Energy) respondents were amongst those making more extensive comments.

Table 13

Question 10: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	4	4%
Consultancy, Training, Assessment or Accreditation	13	7	6%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	11	10%
Housing Association	9	7	6%
Individual or Tenant Group	15	9	8%
Local Authority	23	18	17%
Product Manufacturer, Supplier or Installer	19	11	10%
Professional or Representative Body (Energy)	15	5	5%
Professional or Representative Body (Other)	21	15	14%
Public Body	7	6	6%
Third Sector or Non-Governmental Organisation	14	9	8%
Total	178	108	100%
% of all respondents commenting		61%	

General opportunities identified for key organisations included:

- Leading by example and demonstrating progress in their own buildings.
- Collaborative working and using all key stakeholders in promoting net zero ambitions. Joint public engagement exercises were advocated, as was an attempt to replicate the spirit of working together seen during the COVID pandemic.
- Building on local trust, using trusted local brands and partnerships.
- Presenting a consistent, positive approach, and avoiding mixed messaging. It was argued the number of bodies involved with energy efficiency may be confusing to both the public and those in the sector.
- Learning lessons from the UK Government's Green Deal scheme to avoid reputational damage to the deliverability of the Strategy.
- Building on experience from COVID with respect to the greater awareness of domestic heating among individuals who have worked from home during the pandemic.
- Supporting early, comprehensive public engagement to gain an understanding of the volume of works required to achieve net zero.

Value of local examples

Respondents highlighted the importance of showcasing good examples and of the value of local events and projects in promoting engagement. Suggestions included:

- Local demonstration projects where the public can see how heating systems operate and can meet installers.
- Trialling systems in local areas with costs of the trials underwritten by government.
- Local events outlining what is available in a particular group of streets – such as a heat network or waste heat from an industrial process.

Opportunities for different organisations

Public sector organisations

In the public sector it was suggested organisations can support public engagement by identifying projects that demonstrate their own commitment to low/zero emissions heating as well as by showcasing solutions and promoting heat networks in those areas where these are likely to be the dominant decarbonisation solution.

It was observed that local authorities are well placed to support public engagement with a good understanding of their local housing stock, and the capacity to identify both the worst performing homes and local opportunities. They will also know which previous public engagement schemes have been successful and which have not.

Specific actions suggested for local authorities included:

- Ensuring effective engagement as part of their LHEES and working with local communities to establish which solutions are right for the local area.
- Ensuring that contributions to national targets are set out in relevant strategies and plans including Local Housing Strategies (LHSs) and LDPs.
- Providing information to households and businesses, including through targeted advertising campaigns and activities. Using existing platforms to engage with their residents.
- Leading by example in delivering low/zero emissions heating. Along with housing associations, using their stock to promote best practice and showcase what can be achieved, including to help develop the market for private households.
- Tailoring and promoting local schemes, to aggregate interest/demand.
- Encouraging owners in mixed tenure developments to upgrade their own properties.
- Encouraging joined-up approaches to working, sharing outputs across sectoral stakeholders to inform their plans and strategies.
- Hosting impartial advice services.
- Overseeing implementation standards and redress.
- Ensuring that vulnerable people are being targeted for help and that services support groups, such as older people, to afford energy efficiency upgrades to their homes.

It was, however, often suggested that authorities will require additional resources to support public engagement activity. This was a frequently made suggestion and came from a broad range of respondents.

Housing associations

Housing Association respondents were amongst those suggesting there should be a sector-wide programme around resident engagement to ensure staff understand the issues, are aware of the incentives available and can share key messages with tenants and communities. As trusted, community anchors, it was argued social landlords should be viewed as key stakeholders in communicating with tenants and engaging them in the transition. Housing Associations' existing experience in both energy efficiency and low/zero emissions heating were highlighted and it was suggested that there will be many success stories and examples of good practice that could be used to illustrate how the Strategy can lead to better outcomes for households. The Hebridean Housing Partnership's plans to install 1100 heat pumps by March 2022 (covering 65% of their electrically heated stock and 55% of total stock) was cited.

It was also reported that some social landlords have already been involved in wider communication on energy efficiency, decarbonisation and climate change but that while projects have been successful in engaging communities, the short-term nature of the funding available has made such activities difficult to sustain.

Businesses and trade associations

A range of opportunities suggested for businesses to support engagement included:

- For those involved in the mortgage supply chain and in the home purchase process to support public engagement through signposting.
- For energy suppliers to work with government to educate and inform customers on the benefits of adopting low/zero emissions heating and the choices available to them.
- For heating and ventilation engineers to be included in communication of the Strategy and for improved training and a well-defined role for installers in providing information and advice to consumers. Requiring installers to recommend a low/zero emissions heating option as part of the quoting process was also suggested.
- For builders to educate their staff to recommend advisory services to the homeowner if they express interest in the installation of energy efficiency improvements when other building works are being undertaken.

As a general point it was suggested there could be an opportunity for businesses to associate themselves with a more caring image by demonstrating their commitment to low/zero emissions heat.

Some respondents also highlighted the economic opportunities arising from the transition to net zero, including in terms of job creation.

Roles in engagement suggested for trade associations included:

- Engaging and motivating the business community. Communicating public engagement activity to members, and setting out the business opportunity for their members.
- Gathering views from businesses and presenting collective messaging to Government.
- Providing feedback from members on how schemes are working and insight on what would work best with regard to engaging businesses.
- Using existing networks to distribute information.

However, it was also argued that care should be taken in allowing trade associations and businesses too prominent a role in promoting the Strategy as they are likely to be constrained by commercial interests.

Local community groups, third sector organisations and NGOs

A number of respondents from across a broad range of respondent types emphasised the importance of third sector and local community groups and advocates in public engagement. It was argued these groups may be more trusted by individuals, able to influence sections of society that are not easily reached by government and can tailor messages to their communities. The potential for use of insights from Community Based Social Marketing was also suggested.

It was thought that support for engagement could be provided by:

- Providing information, sharing experience and raising awareness.
- Addressing concerns and promoting the benefits of the transition.
- Representing a specific area or particular community need.
- Directly helping homeowners – for example via bulk procurement to reduce prices or co-ordinating retrofit schemes.
- Highlighting fuel poverty issues, and any risks and unfair practises that may arise.

There were calls for funding for community bodies to support such activities, including for a national community capacity building programme to upskill community organisations to provide the capacity and confidence to help deliver more co-ordinated community action. The West Linton and District Heat Pump Initiative was given as an example of constructive partnership working. In this case, Changeworks is working with Home Energy Scotland to provide a bulk buying scheme for air source heat pumps with bulk purchasing securing a discounted price on heat pumps and installation for customers. Changeworks are providing quality control on the design and costs from the installer, communications and messaging, monitoring, household support and quality control of installations.

Key organisations representing energy consumers were also highlighted as providing trusted voices on retrofitting and renewable heat, and awareness campaigns were reported to have been more effective if relevant stakeholders or environmental NGOs are involved in the development of the communications

strategy. As well as providing a good knowledge of the consumer base, it was suggested NGOs can increase the credibility of campaigns.

Other engagement opportunities

Respondents also highlighted opportunities for other organisations, not typically associated with environmental issues (sports clubs for example) to be involved to broaden the reach as much as possible. It was suggested organisations hosting the public on their premises could potentially include displays or information about adaptations (or in the case of new build, design elements) that improve their environmental performance.

Other potential mechanisms for demonstrating the benefits low/zero emissions technologies to support engagement activity were noted including via:

- A Federated Digital Twin of Scotland.
- A real-world test environment for decarbonised heating.
- Providing virtual tours of homes and remote support.

Finally, it was suggested external events such as COP26 will create a national discussion which can act as a catalyst for the heat transition.

Question 11 - In your opinion, could any of the proposals set out in this strategy unfairly discriminate against any person in Scotland who shares a protected characteristic? (age, disability, sex, gender reassignment, pregnancy and maternity, race, sexual orientation, religion or belief).

The number of respondents answering Question 11 is set out below, with 65 respondents, or 37% of all respondents answering.

Table 14

Question 11: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	2%
Community Council, Trust or Group	6	3	5%
Consultancy, Training, Assessment or Accreditation	13	4	6%
Consumer Advice, Advocacy or Campaigning	8	3	5%
Energy Generation, Supply or Distribution	20	7	11%
Housing Association	9	5	8%
Individual or Tenant Group	15	8	12%
Local Authority	23	16	25%
Product Manufacturer, Supplier or Installer	19	7	11%
Professional or Representative Body (Energy)	15	2	3%
Professional or Representative Body (Other)	21	4	6%
Public Body	7	1	2%
Third Sector or Non-Governmental Organisation	14	4	6%
Total	178	65	100%
% of all respondents commenting		37%	

The most frequently stated position was that the proposals will not unfairly discriminate on the basis of protected characteristics, with many respondents from across a broad range of respondent types taking this view. However, there were also calls for a full Equality Impact Assessment (EQIA) to be carried out and a suggestion that there should be an ongoing process of review to ensure there is no discrimination. Consumer Advice, Local Authority, Housing Association and Third Sector respondents were amongst those calling for an EQIA.

The need for better data with greater detail in breakdown of fuel poor groups by protected characteristics was also highlighted, both to improve awareness and to provide a baseline against which to monitor steps to tackle climate change.

Respondents who thought that there could be unfair discrimination included Consumer Advice, Consultancy, Individual and Professional Body (Other) respondents. Concerns tended to focus on age, with observations including that older people may:

- Require more heating as a result of being at home all day or being more vulnerable to cold and therefore be vulnerable to increased energy costs. It was suggested that the heating profile used for determining an EPC rating does not reflect demand of those at home all day, so use of EPC ratings to predict household energy costs may result in adverse impacts for the elderly or infirm.

- Be homeowners, potentially of traditional properties, although with low incomes and limited ability to pay for improvements.
- Be deterred by long payback periods for some technologies.
- Have limited access to the internet and to web-based information or less opportunity to participate in consultations.
- Struggle to understand why work is required or be resistant to change.
- Be less able to tolerate disruption or may need alternative accommodation while work is carried out. It was argued adaptation of the gas grid to hydrogen could minimise work required at individual properties.
- Be at risk of being targeted by rogue traders.

Other groups highlighted as potentially at risk of discrimination as a result of the proposals were people with disabilities or who are pregnant, who may also be vulnerable to cold. A Campaigning, advocacy and consumer advice respondent reported their own experience that those seeking fuel poverty-related advice were more likely to have a disability and be aged between 25-44 than clients seeking advice on other issues.

Issues were also raised with respect to the Gypsy traveller community, both in relation to how different accommodation types will be considered within the regulatory framework and to use of portable gas cylinders for heating.

There were calls for protections for vulnerable groups to be in put place and for targeting of support to people with protected characteristics. The need to take differences in the way people with protected characteristics experience fuel poverty into account during policy development was also highlighted. There was support for expansion of the Warmer Homes Scotland scheme to support a wider range of households and it was suggested the scheme could be broadened so more of those with protected characteristics become eligible. Partnerships with community organisations who work with people who share protected characteristics and can help reach them and identify their needs was also proposed.

Respondents also commented on the general risk that all those on lower incomes may be disadvantaged by the proposals or welcomed acknowledgement in the consultation paper of the tension between reducing carbon emissions from heating and ending fuel poverty. It was suggested that some low/zero emissions heating systems are more expensive to run, creating greater risk of fuel poverty and that, in the case of heat networks, monopoly supplier costs could increase fuel poverty. Potential discrimination against those who cannot access the capital required for upgrades was also highlighted and it was suggested to be important that homeowners of all ages should be afforded financial help through grants and equity loan funding. It was also suggested those in fuel poverty should be excluded from any CO₂ levies introduced, by setting a threshold level of energy use before CO₂ levies are applied to energy billing.

An analytical framework and methodology for assessment of the social impact of transitioning to a smarter energy system delivered by the “Smart and Fair?” research programme was noted.

Other factors

Some respondents identified other factors they thought could unfairly impact specific groups in addition to those sharing protected characteristics. These included:

- Impacts on specific geographic communities including islands.
- Difficulties for people whose first language is not English, who may need help to understand how to operate new heating systems to best effect.
- Risk of rent increases in the social sector resulting from the requirement to achieve EPC band B by 2032.

Question 12 - In your opinion could any of the proposals set out in this strategy have an adverse impact on children's rights and wellbeing?

The number of respondents answering Question 12 is set out below, with 59 respondents, or 31% of all respondents, answering.

Table 15

Question 12: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8		0%
Community Council, Trust or Group	6	3	5%
Consultancy, Training, Assessment or Accreditation	13	5	8%
Consumer Advice, Advocacy or Campaigning	8	4	7%
Energy Generation, Supply or Distribution	20	4	7%
Housing Association	9	5	8%
Individual or Tenant Group	15	7	12%
Local Authority	23	14	24%
Product Manufacturer, Supplier or Installer	19	7	12%
Professional or Representative Body (Energy)	15	2	3%
Professional or Representative Body (Other)	21	3	5%
Public Body	7	1	2%
Third Sector or Non-Governmental Organisation	14	4	7%
Total	178	59	100%
% of all respondents commenting		33%	

Many respondents from across a broad range of respondent types thought that the proposals will not have an adverse impact on children's rights and well-being. Some respondents highlighted the positive impacts from warmer homes, or argued

that children have most to lose in the longer term if no action is taken on climate change.

Respondents who identified potential adverse impacts also came from a broad range of respondent types. They tended to comment on the implications of increased energy costs for those on lower incomes and the risk of increasing the number of families experiencing fuel poverty. Enhanced heating hours and temperatures required by households with a child under the age of five were also noted. It was suggested that eligibility for schemes such as Warmer Homes Scotland should be extended to support fuel poor homes with children, and that fuel poverty programmes should target support to single parent families.

Other potential adverse impacts on children were suggested to include:

- Household budgets being used to fund energy efficiency improvements rather than welfare.
- Risk of increased rent poverty.
- Potential risks to health if interventions are not appropriate for traditional buildings.

References in the United Nations Convention of the Rights of the Child to rights of children, including participation in decisions that affect them and having their views heard were also noted in support of a bottom-up approach to decision making.

Helping people make informed choices

The consultation paper notes the intention to both invest in growing advice services and adapt and improve them. The digital presence and the advice and support that can be accessed online will be improved, and the support on offer via Home Energy Scotland and Energy Efficiency Business Support will be extended to provide more in-depth and targeted support for households and Small and Medium-sized Enterprise (SME) businesses installing zero emissions heating systems.

Question 13 - What further action can we take to support people to make informed choices on the energy efficiency and heating options available to them?

The number of respondents answering Question 13 is set out below, with 108 respondents, or 61% of all respondents, answering. Consumer Advice, Local Authority, Product Manufacturer and Professional Body (Energy) respondents were amongst those making more extensive comments.

Table 16

Question 13: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	4	4%
Consultancy, Training, Assessment or Accreditation	13	10	9%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	10	9%
Housing Association	9	8	7%
Individual or Tenant Group	15	7	6%
Local Authority	23	17	16%
Product Manufacturer, Supplier or Installer	19	13	12%
Professional or Representative Body (Energy)	15	7	6%
Professional or Representative Body (Other)	21	11	10%
Public Body	7	5	5%
Third Sector or Non-Governmental Organisation	14	8	7%
Total	178	108	100%
% of all respondents commenting		61%	

Raise awareness

Respondents highlighted the importance of raising awareness concerning the Strategy and it was suggested an awareness-raising campaign must be sustained over a long period, including because new technologies will arise over time. The scale of the changes required were noted but it was also suggested that the potential role of hydrogen is delaying engagement for people considering replacing their heating system and that this needs to be resolved urgently.

The importance of tailoring engagement to different audiences in terms of tenure, property type, location, demographic or other motivations was suggested, as was the need to use a range of different channels and not just the internet. It was also suggested that collaboration with social work or healthcare services could increase the outreach effects of campaigns in reaching those most in need of assistance.

Zoning through LHEES was thought likely to spread awareness of optimal pathways in particular areas and it was suggested there should be focused engagement in areas identified for potential heat networks.

Provide information, advice and funding

Many respondents, from across a broad range of respondent types, commented on the characteristics of the information and advice that people will need to make their choices, including that it should:

- Be readily available from trusted sources and in different formats – online, by telephone, by post to all households, and in person. Existing services provided by Home Energy Scotland, Local Energy Scotland, Scarf and Zero Waste Scotland were all referenced.
- Be reliable, independent/impartial, clear, consistent, and in plain language.
- Cover issues such as: which measures available in the area; which are suitable for the property type; whether local planning constraints may apply – for example in conservation areas; what the benefits and costs of measures are likely to be; what financial support will be available in terms of grants or loans; and how to find qualified installers.

Given the complexity of the choices that consumers may need to make, the potential of digital, smarter comparison tools to contribute to making informed choices was also highlighted. Work funded by BEIS to develop open-source tools was noted to be nearing completion.

The importance of providing realistic information – for example on performance, and on running and maintenance costs was also highlighted. With respect to heat pumps, one respondent argued that the methodology used to estimate performance does not incorporate system losses so is likely to exaggerate performance that will be achieved in real world situations. It was suggested information on *in situ* performance of heat pumps, micro-renewables and heat networks should be produced in a user-friendly guide.

Requiring installers to provide independently verified evaluations of the real-world performance of smart heating technology installations and of customer satisfaction, and making these assessments publicly accessible in a database was also advocated as an effective way of lowering barriers for potential adopters.

The need for advice to be tailored according to different audiences or property types was emphasised, the latter particularly with respect to assessment and advice on traditional buildings. Bespoke advice for an individual property and site-specific solutions rather than generic advice were also suggested. A number of respondents, including Product Manufacturer and Professional Body (Energy) respondents, argued in favour of a building renovation passport, setting out a long-term plan for the transition of a building to net zero. It was proposed that such a passport would form a digital record of information on an individual building.

Early advice was also seen as important to allow time to budget and plan. The level of disruption associated with installation of some measures was noted and the importance of minimising early adopters' experience of disruption was highlighted. It was suggested that the levels of disruption people are willing to tolerate should be factored into policy decisions.

Given the requirement to achieve a specific EPC rating, the need to understand the effect measures will have on a property's EPC score was raised. Some respondents suggested that an obvious place for information on the options available would be the EPC certificate.

With respect to where help would be obtained, there were arguments for a one-stop-shop approach and a 'no wrong door' approach – the latter ensuring all services are available, irrespective of the organisation first contacted. A frequently made suggestion from a broad range of respondents was that it will be important to work with trusted local advice services and community groups or networks. Examples cited of specific community groups already providing advice and information included Sustainable Tayvallich and the Blairgowrie Heat Project.

Also with respect to a local approach:

- A review of existing provision offered via Home Energy Scotland and Energy Efficiency Business Support was proposed, including to strengthen integration with local community hubs and to ensure community groups are empowered to assist local residents.
- A recommendation from the Rural Poverty Taskforce for an Energy Carer scheme as a local advice and support service was highlighted.
- It was argued that delivery mechanisms, such as Care and Repair, must be allowed to have a major role in remote rural and island communities and that the Care and Repair model should have equality with processes under PAS 2035.

Improved funding to advice services at both national and local grass-roots level was advocated, with a specific request for longer-term funding to be provided to local agencies.

Local activities such as community workshops, roadshows, and drop-in sessions were suggested to be important in overcoming barriers, as were local opportunities to see technologies in action. Expansion of the Green Homes Network was also welcomed as providing an opportunity to see how systems work and to learn from other householders and it was suggested that, over time, the strategy should be developed to take account of actual consumer experiences.

Consider further assistance

In addition to providing information and advice there were suggestions with respect to more practical assistance – for example in planning or co-ordinating improvement work. These included:

- A project management role, consistent with the remit of a retrofit co-ordinator under PAS 2035.
- Shared procurement – for example, a whole street being converted at same time, with grant claims handled together.
- A management service similar to that offered by the Warmer Homes Scotland programme, which could be developed and offered (for a fee) to the 'able pay' market, depending on the level of 'hand-holding' required.

A Housing Association respondent reported their own positive experience of Resident/Tenant Liaison Officers acting as voice for residents during retrofit projects, providing support for residents and a channel of communication.

Enforce standards and assure quality

The need to ensure consumer protection, including protection from mis-selling, was noted, and an existing best practice guide on heat pumps, including their marketing and selling was highlighted. The intention to draw upon existing quality standards, including TrustMark and MCS was welcomed. Other suggestions with respect to standards and quality included:

- A Scottish Government certification scheme for new technology providers.
- A cap on supply and maintenance costs for shared systems/heat networks.

Question 14 - What is your view on the current level of support and advice provided through existing services such as Home Energy Scotland and the Energy Efficient Business Support service?

The number of respondents answering Question 14 is set out below, with 84 respondents, or 47% of all respondents, answering.

Table 17

Question 14: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	5	6%
Consultancy, Training, Assessment or Accreditation	13	5	6%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	5	6%
Housing Association	9	6	7%
Individual or Tenant Group	15	7	8%
Local Authority	23	16	19%
Product Manufacturer, Supplier or Installer	19	9	11%
Professional or Representative Body (Energy)	15	4	5%
Professional or Representative Body (Other)	21	10	12%
Public Body	7	2	2%
Third Sector or Non-Governmental Organisation	14	7	8%
Total	178	84	100%
% of all respondents commenting		47%	

There was support for the provision of national services to households and businesses and a view that it is essential that key messaging and advice is created and delivered centrally. However, it was also noted that, as centrally based

organisations, these services lack local focus/knowledge and expertise, and the value of partnerships with local services was highlighted.

Views on the quality of the advice currently provided were mixed, with some reporting positive experiences or finding services well briefed on the help available, while others suggested that information providers may not have the skills to carry out proper assessment of homes and properties, resulting in poor quality advice.

Suggestions included that:

- A clear focus and purpose are essential for programmes/services including Home Energy Scotland and the Energy Efficient Business Support Services.
- The scale of the challenge will require significant changes to the services and that independent evaluation of their effectiveness is needed.
- A more integrated approach to linking advice and funding to the Strategy to accelerate uptake of decarbonisation technologies is required.
- Existing services should be consolidated and tied to delivery mechanisms.
- Alternative delivery models should be developed to allow greater self-servicing.
- There should be more advice and support for groups other than low-income households and SMEs which are the present focus of these services.

Home Energy Scotland

The majority of respondents who referenced a specific service talked about Home Energy Scotland. Many respondents, from across a broad range of respondent types, made a statement of support for the service provided by Home Energy Scotland, with descriptions including helpful, good, excellent, and doing a great job or providing a great resource. A number of respondents, including Consumer Advice, Local Authority and Third Sector respondents, highlighted their own partnership working with Home Energy Scotland and a number called for additional support to expand and improve the service or welcomed the intention to do so.

Others, including Individual and Product Manufacturer respondents, were less satisfied, considering the service to be poor, and the advice generic, not practical or realistic, not easy to find, of variable quality or incorrect. The current level of advice and support was suggested inadequate for the transition to net zero.

Specific issues raised, both by respondents who were broadly supportive and those taking a more critical view, included that:

- The service could be better promoted as many people are not aware of the advice and support available. A wider range of channels including non-digital marketing was suggested. Lack of awareness among older people was noted and it was argued leaflets and printed material will also be important to raise awareness about the service among older people. Better linking with social services that already provide support to families and children was also suggested.

- Community outreach work should be expanded or better linked with local delivery agents, including social landlords. Particularly in remote rural communities, it was suggested essential that local providers are effectively resourced and integrated as equal partners.
- Referral and application processes can be confusing and time consuming due to the complexity and range of support offered in different local authority areas. The intended role as a 'one-stop shop' to help identify what measures an individual might be eligible for has not always been effective or clear enough.
- It can be difficult for advice services to know what is actually happening in a household, and it would be helpful to have a mechanism whereby customers can allow their information to be shared by services without fear of non-compliance with data protection.
- Significant resources will be required to provide support with new heating technologies, including one-on-one householder support. It was suggested an in-home service will form an essential aspect of support to ensure that householders are making informed decisions for their unique circumstances, and that assistance is also required both pre- and post-installation to support households to maximise the effectiveness of low/zero emissions heating.
- Emphasis on financial savings ("Go green and save") may raise expectations that are unlikely to be correct in many situations. It was also suggested that nothing on the website instantly promotes low/zero emissions heating.
- Advice should be tailored to particular building types, particularly those of traditional construction.
- Visibility of the financial support available is poor and the value in signposting to funding is limited by the offers available, which vary by region.
- It would be helpful to provide local case histories and further advice on the best times and opportunities to undertake retrofitting work.

Energy Efficiency Business Support

As noted above, relatively few respondents commented specifically on Energy Efficiency Business Support, and some stated that they were unaware of the service or unable to comment.

Those who did express a view observed that:

- The service is useful and relevant but could be better advertised.
- Independent evaluation of the service has found feedback to be very positive, with the helpfulness, knowledge and supportiveness of the consultant, and the promptness and quality of the report all cited, along with appreciation that the service is offered in a neutral manner, without pressure.
- The service is designed to assist SMEs, preventing some business receiving support because they are too big, even if they operate on low margins. It was argued support to help in the transition to net zero should either be given to businesses of all sizes or that thresholds/discretion should be given to specific types of businesses or sectors.

- The website does not provide specific guidance on how people could be changing their businesses to become more energy efficient.

Independent evaluation of the service was reported to have identified areas in which improvements could be made, including more support at the implementation stage. It was also suggested there could be more engagement with small businesses to fully understand the value of net zero heat transition to their business.

Question 15 - Are there any further suggestions that you could provide on how the customer journey through these delivery services could be improved, in light of the ambitions set out in this strategy?

The number of respondents answering Question 15 is set out below, with 70 respondents, or 39% of all respondents, answering.

Table 18

Question 15: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	4	6%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	6	9%
Housing Association	9	5	7%
Individual or Tenant Group	15	5	7%
Local Authority	23	13	19%
Product Manufacturer, Supplier or Installer	19	8	11%
Professional or Representative Body (Energy)	15	5	7%
Professional or Representative Body (Other)	21	7	10%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	6	9%
Total	178	70	100%
% of all respondents commenting		39%	

Improve consumer protection

The importance of robust consumer protection was highlighted, including the need to ensure consumers are aware of their legal rights and have access to redress when necessary, and a boost to funding of Trading Standards was proposed in order to demonstrate that enforcement action will be available. Readily available

information on legitimate funding schemes and the quality of installers was also considered necessary.

Recommendations made to the UK Government for a 'Net Zero Homes Guarantee' were also reported - a government-backed scheme focused on giving people confidence to install low/zero emissions heating systems or energy efficiency measures. It was suggested such a guarantee would help people make informed decisions and establish simple, enforceable protection so people can engage in the market with confidence.

Pursue local approaches

The most frequently raised theme, and highlighted by a broad range of respondent types, was the importance of local approaches. Some respondents highlighted the importance of zoning or area-based approaches with co-ordinated action at local authority level or lower. As at other questions, the value of local advice and local delivery through trusted organisations was emphasised, with some respondents referencing the importance of such an approach in remote or island areas.

Explore new models

The potential of new models such as Heat as a Service to help households adjust to the heating technologies required to reach net zero and optimise were also highlighted.

Provide post-installation support

The importance of post-installation support to educate homeowners on use of their new heating system was raised and seen as particularly important for vulnerable customers. It was suggested Home Energy Scotland could build capacity in this respect but also that this type of support will be labour intensive and will need to be resourced.

Provide financial support

The need for financial support for costly conversions was noted, as was the importance of the speed with which funding, including loans, can be accessed. Investment in organisations that administer and deliver funding packages was proposed. It was also suggested that funding schemes must be simple to understand for both homeowners and the supply chain, and that support programmes must be designed to complement rather than compete with each other.

In terms of other incentives that might be offered suggestions included:

- Tax rebates or removing VAT.
- New energy tariffs or discounts for households/business who transition to low/zero emissions heating systems.

Extend support to businesses

While respondents often focused on the experience of domestic customers, potential benefits of scaling up Energy Efficiency Business Support were also highlighted, with suggested improvements including increased one-to-one support

for SMEs via online technology and apps. Scope for improved support to non-SMEs and the public sector was also suggested.

Consumer Protection

Question 16 - What are the most appropriate steps we can take within our powers to ensure sufficient consumer protection for supported energy efficiency or zero emissions heat installations?

The number of respondents answering Question 16 is set out below, with 92 respondents, or 52% of all respondents, answering.

Table 19

Question 16: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8		0%
Community Council, Trust or Group	6	2	2%
Consultancy, Training, Assessment or Accreditation	13	9	10%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	9	10%
Housing Association	9	7	8%
Individual or Tenant Group	15	7	8%
Local Authority	23	14	15%
Product Manufacturer, Supplier or Installer	19	12	13%
Professional or Representative Body (Energy)	15	6	7%
Professional or Representative Body (Other)	21	9	10%
Public Body	7	3	3%
Third Sector or Non-Governmental Organisation	14	8	9%
Total	178	92	100%
% of all respondents commenting		52%	

Very much reflecting the issues discussed above, some comments focused on the importance of clearly signposted and reliable free advice as an important starting point. The Scottish Government's work to date - through services such as Home Energy Scotland - was welcomed, as was their commitment to work with consumer organisations and energy companies to ensure that consumers are engaged and protected.

It was also suggested that the Energy Consumers Commission, and forthcoming Consumer Scotland, have an important role to play in supporting consumers in the transition. A further suggestion was that there is a need for a trusted body to

coordinate the transition and provide SMEs and home occupiers with helpful advice; one option would be to establish a heat delivery body to be responsible for consumer communication, advice and delivery of the heat transformation (in a similar capacity to previous successes such as Digital UK with the Digital Switchover Campaign).

The potential for further engagement with the regulated energy industry in Scotland to ensure that the protections and assistance already available are adopted for energy efficiency measures was also highlighted. It was suggested that the final Strategy will benefit from input from other third parties, including Citizens Advice Scotland, Energy Action Scotland and the Scottish Fuel Poverty Partnership Forum to set out how consumers can be protected.

In terms of consumers themselves, one point raised was that customers may become weary if approaches designed to offer them protection are overly disruptive and burdensome, for example with multiple access requirements, multiple visits, multiple faces and endless follow ups. There was a note of caution that cumbersome approaches could result in customer confidence being lost and any meaningful rollout being hampered.

Information format and content

One suggestion was the establishment of a public-facing database that includes key information required by consumers looking to install measures. The database could be linked to TrustMark's planned Property Hub (still in development) which provides access to information relating to existing measures on properties including guarantees and warranties.

Other comments included that information could be tenure specific and cover a range of technologies. In terms of specific information that should be included, suggestions were:

- Funding schemes, including both national and local authority schemes.
- Information on how to find and engage properly skilled tradespeople. This could be developed in partnership with representatives of the supply chain. It could include a checklist of questions to ask, depending on the measure to be implemented. This was the most frequently made suggestion and was made by a range of respondent types.
- Accreditation scheme details.
- Redress information, signposting, and support.
- Information about possible scams.

Accreditation and training

Comments on accreditation and/or training requirements included that more robust qualification criteria will be key. Specific suggestions included:

- The development of a 'Low Carbon Skills Card', similar to the existing Gas Safe ID Card; this could be a valuable mechanism to provide reassurance to the consumer that the installer has the required credentials and is of sufficient

competency. Related comments were that all individual technology courses could feed in to a 'Low Carbon Skills Card'.

- Requiring installers to undertake Continuing Professional Development activities.
- Including training on standards and ethical practices as part of skills development for supply chain.

It was also suggested that regulation of the retrofit process, including the roles within it, could be required by law.

There were comments focused specifically on heat pumps, including that a Heat Pump Qualification should be created and required in order to carry out heat pump installations. It was suggested that this could be similar to the current Gas Safe Register. In relation to the current situation, it was reported that there is already a specific Ofqual training course, that there are installation standards, and that consumer protection is provided through membership of a trading standards organisation. It was also reported that the heat pump industry is developing a clear and accessible route to becoming a certified installer.

There was a call for approved installer schemes to be developed, or Trusted Trader type approaches to be taken. Further suggestions included ensuring that:

- Organisations such as Home Energy Scotland and Trading Standards Scotland continue to support and promote reputable installers.
- Online registration checks of tradespeople can be carried out.

Linking any publicly funded financial support options to the use of accredited suppliers was proposed; it was reported that other UK Government initiatives such as the Greens Home Grant required those installing energy efficiency measures to be certified:

- To install measures against a number of PAS Standards.
- By a body that has been accredited by the United Kingdom Accreditation Service.

The expectation was that comparable steps to safeguard the competency and quality of workmanship of those carrying out installations would help ensure consumer protection. However, there was also a concern, linked to the implementation of PAS 2030/35, that a skills gap and lack of accredited installers could drive up the cost of measures and risk housing associations, and particularly those operating in rural areas, being unable to access Energy Company Obligation (ECO) funding.

Finally, whilst most respondents focused on accreditation/registration for installers, there was also a call for stringent accreditation of energy advisors.

Standards and regulation

It was suggested that a Trusted Trader type quality assurance standard, monitored and regulated by the Scottish Government, or third sector organisations would

provide assurance to consumers that energy efficient or zero emissions heat installations are going to be high quality and at an industry safe standard.

There were also references to MCS standards and certification. It was suggested that UK consumer protection rules may not be fully sufficient, and there was a call for all renewable installations to be certified to MCS standards and installed by MCS Certified contractors. However, there was also view that in its current form the MCS scheme is overly-bureaucratic and inefficient and needs to be reviewed.

Further comments and suggestions were that:

- The recent Heat Networks Scotland Act has demonstrated that there are ways of setting and ensuring standards within the remit of Scottish delegated powers which can provide some consumer protection. However, new UK consumer protection legislation that can offer the protection needed across a range of heat technologies may be needed.
- There should be a focus on common frameworks and standards across Scotland rather than a patchwork of different approaches.
- The forthcoming review of Scottish Building Regulations should include a requirement that all new homes prove that design specifications have been achieved and high installation standards have been delivered.
- Fuel and energy are to be included in the scope of the planned New Homes Ombudsman and retrofit works and heating installations in existing dwellings could be included within its scope. However, it was also noted that progress on the creation of a New Homes Ombudsman appears to have stalled and it was suggested the Scottish Government could work with their UK counterparts to take this work forward.

Whilst quality standards were seen as having a role in addressing poor quality workmanship and inappropriate installations, there was also a concern about the timescales for the implementation of PAS 2030/35 and their impact on installers, their supply chain, government funded energy efficiency programmes and, ultimately, those in fuel poverty. There were calls for the Scottish Government to act immediately and in a way that supports the PAS transition.

As noted above, one suggestion was that there should be regulation of the retrofit process. Other suggestions included:

- Ensuring designers have indemnity insurance.
- Installers being required to only use products that come with a manufacturer warranty.
- Suppliers should be compelled to be part of an accredited body that provides an underwritten 'safety net' for customer guarantees should such firms collapse.
- Developing a redress fund to support consumers when things go wrong. Specifically, developing an insurance-backed installation scheme with access to a consumer redress fund.

There was also a call for Scottish Government intervention to reinforce the longer-term applicability of warranties on the performance and installation standard of components.

Monitoring and enforcement

There was reference to the importance of both monitoring and enforcement in helping to build consumer confidence, and concern that, at present, there is no means to monitor the number and nature of complaints received, identify trends and take action to address emerging issues across the retrofit industry.

Suggestions as to how a monitoring regime could or should be developed included:

- Requiring post-installation inspections.
- Installers should bear liability and there should be a power to mandate corrective actions be taken by installers.
- Including more regular quality assurance of installations which are publicly funded.
- Allowing for quality assurance as part of a loan package for self-funders.
- Carrying out national regulation pilots with local regulators. These could be used to test and evaluate requirements and feedback on areas for improvement.

There was a call for increased funding for Trading Standards Scotland to support their work in pursuing consumer protection. This would include enabling strong enforcement action, with the twin aims of acting as a deterrent to rogue traders and ensuring the public is aware of how aggressive selling or misleading selling practices are addressed. Further comments or suggestions relating to enforcement included that:

- Trading Standards could provide a 'clerk of works' type support.
- Further measures should be taken to monitor and identify any false installers to ensure they are dealt with swiftly and effectively, reducing the chance of them impacting any customers.
- It would be useful to have the names of Directors of companies whose companies have been found guilty of fraud and malpractice in this area, published or shared across procurement hubs.

Other possible options

Other suggestions included that the Scottish Government could consider/look at:

- Legislation to put district heat on the same consumer footing as electricity and gas.
- Supporting early adopters if they need to consider a change to an alternative technology at a later date as technology options and markets mature.

Question 17 - Do you have views on whether we should adopt the use of the UK government's TrustMark quality assurance framework?

The number of respondents answering Question 17 is set out below, with 87 respondents, or 49% of all respondents, answering.

Table 20

Question 17: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	2	2%
Consultancy, Training, Assessment or Accreditation	13	9	10%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	7	8%
Housing Association	9	7	8%
Individual or Tenant Group	15	5	6%
Local Authority	23	14	16%
Product Manufacturer, Supplier or Installer	19	9	10%
Professional or Representative Body (Energy)	15	7	8%
Professional or Representative Body (Other)	21	11	13%
Public Body	7	2	2%
Third Sector or Non-Governmental Organisation	14	7	8%
Total	178	87	100%
% of all respondents commenting		49%	

Quality assurance schemes or frameworks

A number of respondents made general observations or suggestions relating to quality assurance schemes or frameworks. It was suggested that all works should be covered by recognised quality assurance frameworks and that it is vital to have credible consumer protection in place. It was also suggested that both consumers and the supply chain need certainty about forthcoming standards and accreditation in order to prepare adequately.

There was reference to recent research by Citizens Advice Scotland which identified twelve schemes across the energy efficiency and renewable sectors, including a Scottish Government certification scheme which allows self-certification by the trade for complying with building regulations. An associated concern was that the variety and number of schemes can cause confusion among consumers, making them more vulnerable to being scammed or making uninformed decisions.

Other concerns raised about how some certification and trader schemes operate currently included that:

- For some measures there is a monopoly situation which reduces the ability to find best value. For example, it was reported that for internal wall insulation there is currently only one guarantee provider in the UK. To provide TrustMark with a guarantee there is no alternative but to use this provider. This provider then requires installers to use one of their registered system manufacturers.
- Some do not remove businesses from their membership lists when they fail to meet the scheme standards.

Respondents also identified a number of features which they saw as vital for any future scheme, including that it should be recognised, promoted, free and trusted.

It was also considered as essential that any framework approach does not create further barriers to market entry and to installers being able to access government support and effectively move into the installation of heat pump and other low/zero emissions technologies. Not creating barriers for smaller installer companies and local tradespeople and contractors was seen as specially important. It was reported that there is very limited incentive to busy traditional rural contractors (who are often micro-SMEs) to participate in these types of schemes as there is usually a cost implication. This means the system generally favours the larger scale contractors at the expense of smaller ones. Ensuring this does not happen was seen as critical to allowing large scale adoption and implementation.

One suggestion was that the Scottish Government could helpfully provide funding support for training and accreditation to ensure that there is a suitably qualified supply chain to deliver the low carbon transition.

There was also a call to explore different mechanisms that will facilitate accreditation, for example through enabling SMEs to be accredited as part of a consortia.

Adoption of TrustMark

Most of those who expressed a clear view were in favour of adopting the use of TrustMark, with these respondents coming from a broad range of respondent types. Respondents sometimes noted that their support was dependent on TrustMark being known or having been shown to be effective, ensuring that installations are of high standard and customer satisfaction is high and that any issues are addressed swiftly. Some also noted that they supported either the adoption of TrustMark or another suitably accredited scheme.

Reasons given for supporting the adoption of TrustMark included that:

- It provides a range of consumer protections including a Consumer Code and Consumer Charter. Additionally, it promotes reputable installers to consumers, improves sector standards, and tackles related issues such as better enforcement.
- It would bring consistency and avoid having varying standards in the different nations of the UK. This was the most frequently given reason and was raised

by a broad range of respondent types. There was also a view that, irrespective of the specific approach chosen, a common UK-wide approach would be beneficial. Benefits associated with a UK-wide approach included that it would enable installers to work cross-border.

- It would avoid reinventing the wheel, involving unnecessary additional cost and time. Also, it has already been applied at scale in the UK through the ECO.

In terms of how TrustMark could or should be applied, suggestions included that:

- It may be useful for the Scottish Government to have dialogue with the UK Government to understand the full workings and challenges with the TrustMark to identify further areas of improvement, especially around zero emissions heating technologies.
- In line with general comments around accreditation at Question 16, TrustMark accreditation should be a requirement for the installation of measures under all relevant Government funding schemes.

However, some respondents did raise concerns about going down the TrustMark route. These included that:

- The Green Homes Grant in England involved TrustMark for the first time in domestic renewable heating. It was suggested that the involvement of TrustMark did not add anything to the quality of heating technology installation but created some confusion, for example, over whether MCS (discussed further below) or TrustMark takes precedence when resolving customer complaints.
- TrustMark would appear to be more bureaucratic and costly than is required, particularly when compared to some of the existing quality assurance approaches in place. It was suggested that the adoption of TrustMark certified systems could also add at least £2,000 to the cost of an average External or Internal Wall Insulation install.
- It would appear to be particularly unwieldy for a rural area. Some Trustmark certified systems and 25-year manufacturer warranties are not reasonably accessible in rural areas.
- Some landlords, particularly those with large portfolios of let property, may wish to use in-house builders to carry out some or all of the works and these are unlikely to be TrustMark approved.
- Very much in line with a general concern about any approach, that the costs for installer training to reach the level of TrustMark could be a barrier for some micro and small enterprises who may not be able to afford the time and cost commitment to train for TrustMark.
- Research by Changeworks (commissioned by Citizens Advice Scotland), identified concerns, including that TrustMark provides information and assurances at the first stage of the consumer process but leaves consumers to navigate the convoluted landscape of certification and trader schemes at the other end of the customer journey.

- TrustMark requires installers to provide a guarantee, but some of the conditions and exclusions applied to the guarantees could render them inadequate. Also, as outlined above, guarantee requirements can place constraints on competition and choice.
- The TrustMark website is not particularly consumer-friendly.
- Using a UK-wide scheme may introduce confusion where the devolved regions are operating to different strategies and frameworks.

Others questioned either the timing of any decision to adopt the use of TrustMark or whether sufficient consideration has been given to such a move. It was seen as important not to rush forward with a scheme that does not meet requirements, with a connected point that TrustMark should only be adopted if it can provide a robust standard for installation, be enforceable to address poor quality installations and provide adequate consumer protection.

One suggestion was that, if it is decided that TrustMark approval should be a requirement, then this should be phased in over a period of time to allow more businesses to register so that there is adequate choice for property owners.

MCS and other schemes

Respondents also commented on other existing schemes, and MCS in particular, with observations including that there is already a quality assurance and consumer protection regime in place for renewable heating systems. Consultancy and Professional Body (Other) respondents were amongst those making this point. It was reported that:

- It is predicated on MCS certification of installers and products.
- One of the conditions of MCS installer certification is membership of a Consumer Code approved by the Chartered Trading Standards Institute (CTSI).

A respondent who is both a CTSI-approved Consumer Code operator and a TrustMark scheme operator, expressed a view that TrustMark framework requirements are less rigorous than those set out in the MCS installer standards and the CTSI-approved Consumer Codes. This led them to conclude that, for installers working with renewable heating systems, the TrustMark quality assurance framework will add nothing to the rigorous regime that is already in place.

Others were of a similar view, suggesting that if there is a good standard there is no need to, or value in, creating another. Rather, it was suggested that Scotland has an opportunity to develop a better and more efficient system, that prevents duplication and reduces costs for those installing domestic renewables.

However, a slightly different perspective was that an alignment between MCS and TrustMark is needed to reduce complexity. It was suggested that the inclusion of both TrustMark and MCS certification requirements adds cost to installers and increases the disparity between fossil fuel and low/zero emissions heating installers. There was a call for a level playing field to ensure that additional burden is not added to heat pump installers unnecessarily.

Beyond TrustMark and MCS, it was also noted that many established technologies, such as wood pellets, already have recognised quality and sustainability marks. There was a query as to whether TrustMark would be intended to be a replacement for these already established accreditations or in addition to them. The concern about the latter approach was that it would create additional costs that would be passed on to consumers.

There was also reference to:

- The existing quality assurance framework in place under Warmer Homes Scotland, which was reported as going beyond requirements under TrustMark and as already providing a high-quality service via an established supply chain of 22 local, Scottish businesses.
- The Accredited Certification Scheme and Gas Safe approach. It was reported that the industry has worked together over many years to improve quality and safety and that the approach is robust and able to support a mature mass market.

Alternative options

There was also a view that a Scotland-specific scheme may be more appropriate. There was reference to the Energy Efficient Scotland-related recommendations made by the independent, industry-led Quality Assurance Short Life Working Group, including that the Scottish Government should develop a Quality Mark for the programme. Further comments included that:

- It would create a single 'badge' to which suppliers and traders operating through government schemes would have to adhere.
- Lessons should be learned from other programmes, such as the UK Government's Green Deal, and from the work of the water industry in Scotland, to ensure that the Quality Mark and Energy Efficient Scotland became a high quality, trusted brand.
- All suppliers wishing to take part in the programme would be required to demonstrate they met certain mandatory requirements such as fair work practices, workmanship guarantees, customer care and a code of conduct.

Addressing Fuel Poverty

Question 18 - In your view, is there any further action that we, or other key organisations (please specify), can take to protect those on lower incomes, and those in or at risk of falling into fuel poverty, from any negative cost impact as a result of the zero emissions buildings transition?

The number of respondents answering Question 18 is set out below, with 89 respondents, or 50% of all respondents, answering.

Table 21

Question 18: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	2	2%
Consultancy, Training, Assessment or Accreditation	13	9	10%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	9	10%
Housing Association	9	7	8%
Individual or Tenant Group	15	7	8%
Local Authority	23	13	15%
Product Manufacturer, Supplier or Installer	19	10	11%
Professional or Representative Body (Energy)	15	6	7%
Professional or Representative Body (Other)	21	7	8%
Public Body	7	5	6%
Third Sector or Non-Governmental Organisation	14	8	9%
Total	178	89	100%
% of all respondents commenting		50%	

There was a broad consensus, from across a range of respondent types, around the importance of ensuring that the transition to zero emissions is just and will not have an adverse impact on those in, or at risk of, fuel poverty. The intention that the final version of the Strategy will include a set of guiding principles to underpin Scotland's commitment to no one being left behind was welcomed.

However, there was also a concern that the twin focus on tackling both fuel poverty and reducing emissions using the same tools could mean that neither is addressed in the most satisfactory way. Also, and as covered in greater detail at earlier questions, there was a concern that heating costs are likely to rise for a significant proportion of consumers who opt for low/zero emissions heating and that the cost of installing and running low or zero emissions heat systems could tip some households at the margins of affordability into financial stress.

In terms of protecting those on lower incomes, or in or at risk of falling into fuel poverty, it was seen as important to:

- Not put pressure, and thereby further strain, on fuel poor households to make changes that are not financially viable for them.
- Ensure that the costs associated with reducing emissions from homes are not met by those who cannot afford them. It was suggested that Scottish Government actions should support a safety-net to prevent this by ensuring sufficient funding is available for those households that are just getting by.

Evidence base

There was support for the Scottish Government's intention to commission further analysis on the distributional impacts of decarbonisation on those in or at risk of fuel poverty or on lower incomes. Whether individual heat pump installations will alleviate or worsen fuel poverty was identified as an issue to be considered. An opportunity to consider lessons learned was highlighted, with the range of initiatives and measures ongoing in Orkney given as an example.

There was also a call to use performance measurement to protect people from the incorrect or inappropriate installation of heat measures.

Specific groups or areas

In terms of considering the impact of the transition on specific groups of people, or types of household, suggestions included:

- Households just below the radar for interventions that are firmly targeted on those already clearly in fuel poverty.
- Those experiencing in-work poverty.
- Those living in rural and off-gas grid homes, including because of high upgrade costs. Rural and islands communities were reported to be especially vulnerable to changes to the cost of heating due to the prevalence of housing stock with poor energy efficiency in these areas, combined with limited choice of feasible heating systems.

With respect to rural and island communities it was reported that, whilst Scottish figures indicate 25% of households are living in fuel poverty, this figure is the national average, and fails to highlight the situation across many rural or island local authority areas. For example, the figure increases to 40% in the Outer Hebrides. The figure for extreme fuel poverty in the Outer Hebrides is twice the national average at 24%.

It was suggested that areas with high levels of fuel poverty could be targeted for collaborative action, and deeper retrofit measures, and that this could be done through LHEES. One option proposed was for full costs to be covered by subsidy for the fuel poor, with such an approach potentially offering a range of benefits, including:

- Reducing the public health burden associated with living in fuel poverty.
- Increasing disposable income amongst fuel poor households, potentially contributing to wider economic recovery.
- Providing a scale to market growth that could mean solutions are more cost effective for future, privately funded installations.

More generally, it was noted that fuel poverty is the result of a combination of factors, most obviously household income and there was an associated query as to whether it is not best addressed through a more generic response to poverty and low income, such as through the welfare benefits system. Specific suggestions included:

- A 'winter energy payment' scheme that is an extension of the current 'winter fuel allowance' and which could potentially be means tested. A fuel voucher scheme could be made available to those in need.
- Making existing frameworks such as the Warmer Homes Scheme more accessible to a wider range of claimants.
- Raising awareness of funding packages which could cover 100% of costs for those low-income households. Widening the criteria for those who can access financial support, including by increasing options for those in social housing.
- Extending the definition of vulnerable customers to include those in fuel poverty.

Information, advice and support

As at previous questions, the importance of high quality and bespoke advice and support was noted, with further suggestions including that it should be provided by organisations that are trusted locally and be face-to-face. It was also suggested that existing organisations such as Home Energy Scotland, Scarf and Changeworks can provide key support in ensuring that any new zero emissions heating technologies do not unintentionally push people into fuel poverty. It was suggested that the resources must be available for affordable warmth and for advocacy services to ensure that staff are confident in dealing with both the technical and financial implications of adopting low/zero emissions heating technology.

The potential for RSLs and local authorities to work with their tenants, and especially those who are vulnerable, was also highlighted, as was an opportunity to develop a new network of energy champions, employed at a local level, to engage effectively with communities and provide training for organisations who provide services to customers likely to experience fuel poverty.

In terms of the type of support that could be provided, suggestions included:

- Being 'first point of call' for anyone interested to install zero emissions heating technologies.
- Offering one-to-one support to ensure that the installation and heating costs will be affordable.
- Ensuring that any quality assurance framework, such as TrustMark, is applied.
- Offering additional support around using some of the new technology.

Energy efficiency measures and fabric first

As at other questions, a number of respondents noted their support for the fabric first approach set out within the consultation paper. This was a frequently made point and was highlighted by a broad range of respondent types. Further points included that the commitment, following further research and if appropriate, to maximise opportunities to install secondary technologies, is welcome and that financial assistance for households either in or most at risk of fuel poverty to retrofit their homes should be prioritised.

Installation and maintenance costs

A general point was that it will be important to consider the role that support, including additional financial support, could play in avoiding householders being financially disadvantaged as a result of installing a low or zero emissions heating system. It was also suggested that there are global examples of different financing and delivery models, such as BlocPower in the USA, which have made zero emissions heating more accessible and affordable. These can be particularly effective in multi-owner buildings where coordinating and managing the cost of implementation and management of zero emissions technology may be an obstacle.

Other general points raised around installation included that:

- There should be a duty to highlight maintenance costs as well as running costs.
- It will be important for regulation to be linked to replacement cycles to ensure that, wherever possible, systems are not replaced prematurely.

Transition to Heat Pumps

Given that electric heat pumps are more expensive to buy than fossil fuel boilers, a number of possible supports relating to installation were proposed:

- Support targeted specifically at fuel poor households, covering a proportion of installation costs, for example 90% of the cost of installing electric heat pumps in fuel poor homes, to ensure that households pay no more than they would upfront for a fossil gas boiler.
- Support available to all households, ensuring that households pay no more than they would upfront for a fossil gas boiler. It was suggested that this will typically require a grant of up to £8,000 per household. Higher levels of support should be provided to lower income households, who will have a higher risk of falling into fuel poverty.

Transition to Heat Networks

It was suggested that heat networks can cut both emissions and bills and are a viable option to alleviate fuel poverty. It was suggested that the Scottish Government could encourage connection to existing local heat networks and also ensure that there are no financial barriers to connection to a renewable heat network, whether new or existing.

Tariffs and running costs

It was suggested that it may be appropriate to regulate or require the introduction of specific tariffs for households identified as in need of support. Alternatively, consideration could be given to the establishment of a national not-for-profit energy company that would offer those households affordable tariffs and ensure that the transition from conventional to low/zero emissions heating systems does not come at additional costs to the household.

Many of the comments about tariffs and running costs referred to the importance of continuing to work with the UK Government in relation to how policy costs are

transferred onto energy prices. There was reference to the UK's Sixth Carbon Budget¹³ from the Committee on Climate Change, and its call for a rebalancing of gas and electricity prices. Respondents' comments included that action should be taken as soon as possible, and that:

- The fairest way is to remove policy costs from the domestic electricity bill completely and to fund any schemes going forward out of general taxation.
- A carbon price should be placed on domestic heating to reflect carbon emissions.

There was reference to the role of Ofgem, with their active involvement in the delivery of net zero described as crucial and fundamental. However, it was reported that their current position on the electricity and gas markets is one of 'even-handedness', despite the electricity being decarbonised and gas remaining a source of carbon emissions. There was a call for the Scottish Government/Parliament to work for a recalibration of this position.

Other comments relating to tariffs and cost to the consumer included that:

- There should be some form of ongoing public commission and continuing parliamentary scrutiny of suppliers that should be seen to take a proactive interest in clarity over pricing.
- Energy companies should adjust their other tariffs so 'better off' families indirectly subsidise the worst off through a price differential. This was suggested as a simple and effective means of wealth redistribution and as directly assisting fuel poverty objectives.
- A social housing tariff structure could be developed to protect tenants of RSLs and Councils. Although the Warm Homes Discount addresses this in part (for those receiving Pension Credit), many others do not get a payment.
- Heat networks, particularly when supported by long-term agreements to supply public sector users, can help reduce volatility in price and risk, and thus help enable better terms for lower credit worth or unstable consumers in the area.
- Further work is required to promote 'switching'. One suggestion was that utility companies might be compelled to advise consumers at end of contract periods that cheaper tariffs may be available.

Other suggestions were focused on mechanisms that could be used to support households to deal with any potential cost increases, both in terms of mitigating those increased costs and reducing the amount of energy used. They included that:

- Offering price rebates on electricity to low-income families who install zero emission heating systems could help to address cost increases relative to mains gas until the energy price market redresses this imbalance.
- The Scottish Government's proposal to work with energy retailers to ensure all households, including those on pre-payment meters, have access to smart and flexible tariffs, is welcome.

¹³ Available at: <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

- There is smart price technology that allows consumers to adapt their heating usage in response to price signals, for example by adjusting a heat pump's consumption according to the time of day at which electricity prices are lowest. There was also reference to the potential of Heat as a Service technology to help people manage how much they spend whilst getting the heat they want.

On the theme of smart technology, the need for digital infrastructure and digital awareness as an enabler of many smart heating technologies was also highlighted.

With respect specifically to heat pump running costs it was suggested that, although heat pumps will provide lower running costs in comparison with oil and LPG installations, they could in some cases have higher running costs in comparison with gas boilers. Installations supported by Government funding should therefore be assessed to ensure that they will not lead to higher running costs.

Question 19 - What are your views on our approach to phasing out funding for fossil fuel heating systems by 2024 where it is not detrimental to our fuel poverty objectives? Do you think that this could be achieved any sooner than 2024, and if so how?

The number of respondents answering Question 19 is set out below, with 94 respondents, or 53% of all respondents, answering.

Table 22

Question 19: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	4	4%
Consultancy, Training, Assessment or Accreditation	13	7	7%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	8	9%
Housing Association	9	8	9%
Individual or Tenant Group	15	8	9%
Local Authority	23	16	17%
Product Manufacturer, Supplier or Installer	19	11	12%
Professional or Representative Body (Energy)	15	8	9%
Professional or Representative Body (Other)	21	7	7%
Public Body	7	4	4%
Third Sector or Non-Governmental Organisation	14	7	7%
Total	178	94	100%
% of all respondents commenting		53%	

A number of respondents, from across a broad range of respondent types, noted their support for the plan to phase out funding for fossil fuel systems by 2024. These respondents often highlighted that their support was dependent on certain risks being avoided, including that it should not lead to incorrect or inappropriate installations or increase the risk of fuel poverty. It was suggested that the scope of what is deemed to be 'detrimental' to the fuel poverty objective should be clearly defined to avoid it becoming too subjective or having too broad an application.

In terms of aspects of the approach that were particularly welcomed, comments included that the 2024 commitment gives industry a clear timeline for the end of funding and will allow a transition to the new strategic technologies.

Respondents also identified a number of conditions that will need to be in place to support a successful phasing out of the funding. These included that:

- Preferred quality standards will need to be in place in good time.
- The right support mechanisms, such as support to install secondary technologies, must be in place to support those who might end up with higher fuel bills.

It was also suggested that there must be scope for exemptions in certain circumstances, such as:

- Where a householder may be particularly vulnerable and unable to cope with a significant change to the type of heating system they have.
- For traditional properties that may find it more difficult to transfer to alternative technologies. This may be a concern for pre-1919 traditional properties in rural areas where there is a larger proportion of off-gas grid houses.
- For transitional heating systems with a clear pathway to net zero, such as LPG.

In terms of the 2024 timescales, a number of those who agreed with the 2024 target suggested that it would be difficult to achieve a phasing out before that date. Reasons given included that:

- Infrastructure issues may be a barrier.
- The approach aligns with the timings of greening of the electricity networks and the start of hydrogen deployment into heat networks. It not feasible to achieve this before 2024.

Challenges with phasing out funding by 2024

Others, including Community Council, Local Authority and Professional Body (Other) respondents, raised concerns about whether the 2024 target is realistic or achievable, with a call for the final Strategy, and the upcoming Fuel Poverty Strategy, to offer clarity on how a detrimental impact on fuel poverty will be avoided in practice. Reflecting some of the themes covered at Questions 1 to 3, there were also references to some of the technological challenges and possible unintended consequences associated with achieving the 2045 net zero target and the interim 2030 target. For example, it was suggested that:

- There is a potential conflict between replacing fossil fuel systems and reducing fuel poverty, particularly where heating is being electrified. This will be mitigated by the application of the correct tariff, hence tariff review and switching should form part of the feasibility process and project implementation.
- Any approach to phasing out funding should avoid stranding existing heat networks which largely rely on gas fired combined heat and power (CHP) to keep heat tariffs low for customers, particularly those at risk of fuel poverty.
- There needs to be a clear distinction between the funding for coal, oil, and natural gas heating systems. The approach should be reconsidered in light of the opportunity to use low carbon hydrogen as a replacement for natural gas in selected areas across Scotland before 2030. However, public funding for natural gas heating systems after 2024 should only continue with a stipulation about the installation of an approved 'hydrogen-ready' boiler.

From a system perspective, there were concerns that a 2024 target could:

- Put too much pressure on the deployment of low/zero emissions technology and could be an issue if there is insufficient capacity in the supply chain. There was an associated concern that this could encourage entrants that are not industry-recognised and could impact on quality.

- Create distribution network challenges; for example, Shetland is due to have a grid link to mainland Scotland up and running by 2024, but the distribution network around the rest of Shetland will be the same as now and therefore there will be competing electrical demands on this grid with higher costs to buildings for network reinforcement.
- Have an impact on rural properties away from the gas grid. An example given was that in remote and rural areas, the only option for new builds is likely to be heat pumps; heat networks are not an option in dispersed communities and hydrogen may not be developed fully by this stage. Also, on-site combustion of hydrogen in new build, may not comply with this regulation.

From an NHS perspective, it was reported that 2024 is not achievable because the requirement for a high grade of heat for many of their sites that cannot be achieved through current low/zero emissions technology. It was reported that until such technology exists and is commercially viable, the NHS will need to use fossil fuels.

In terms of the impact on individual households, and those in or at risk of fuel poverty in particular, concerns included that:

- The proposed deadline of 2024 gives little time to ensure that consumers are sufficiently well informed about the non-fossil fuel alternatives which are suitable for the particular property.
- It is highly likely that households using fossil fuel to heat their home will also be using it for cooking purposes. This will add an additional cost either to replace the appliance or continue to pay a standing charge as the meter cannot be removed. Funding is necessary and critical to the whole house impact of phasing out fossil fuel.
- The approach is not compatible with the Fuel Poor Network Extension Scheme, which has recently been extended until March 2026 under the Ofgem 2021 price control review.
- Before any timeline is set, proposed changes to the EPC methodology need to be implemented so that property owners updating their properties to included zero emission heating systems are not penalised.

Social rented sector challenges

A number of concerns were raised regarding the impact on new supply for the social rented sector, given the potentially higher capital costs, running costs and maintenance costs of these systems when compared to conventional fossil fuel systems. There was an associated concern that rent levels could need to increase due to the significant level of investment required. Whilst it was recognised that the affordable housing sector is well placed to drive forward innovation in heat decarbonisation and can help to build a market and supply chain, there was a call for adequate support to be put in place and for the impact to be recognised and reflected in the Affordable Housing Supply Programme.

In terms of existing social rented sector supply, it was reported that there has been a substantial body of ongoing work relating to EESSH and EESSH2 and that the majority of this work has been funded through landlord's own resources. It was

noted that, while in general it would be counterproductive to install fossil fuel systems which will then have to be replaced at a later date, there may be some properties where, at present, a gas boiler upgrade remains the most cost-effective way of improving energy efficiency and reducing energy costs. The need to balance the short-term alleviation of fuel poverty against long-term asset management strategies was highlighted, as was the importance of ensuring that the risk of fuel poverty is not simply replaced by the risk of rent poverty.

Finally, it was suggested that even where households are not experiencing fuel poverty, many social tenants will want to keep their gas boilers, giving RSLs the further challenge of balancing the desires of tenants with Scottish Government ambitions and asset management strategies/heating replacement cycles. It was suggested that there is a role for the Scottish Government in developing a public engagement strategy which educates everyone in the importance of tackling the climate emergency and decarbonising heat.

Phasing out earlier than 2024

Some respondents, from across a range of respondent types, argued that the phase out date should be immediate, earlier than 2024 or should be earlier than 2024 if possible. This included if it would be possible without risking increases in fuel poverty.

It was also suggested that the phase out date could vary, for example that there should be an earlier deadline for:

- New build. It was reported that new build is by far the easiest target in terms of making the shift to low/zero emissions heat.
- Major refurbishment of existing buildings.
- Properties on the gas grid. It was suggested that this should be undertaken as soon as possible, with robust measures in place to verify that a low/zero emissions heating installation will not lead to higher running costs.

It was also suggested that there may be scope to accelerate progress in some areas of the country more quickly than in others. Other proposals were:

- An earlier phase out date for high carbon fossil fuel heating. It was suggested that these should be taken offline with urgency – from as early as 2022. It was reported that many Government and local authority schemes have already installed heat pump systems in off-gas grid areas and this approach should be made the norm.
- Giving households the option to either continue to receive support for high emissions heating systems or receive a higher level of support for energy efficiency works.
- If the date is not brought forward, that future proofing could be required, for example by updating radiators so that they can operate at a lower flow temperature.

Question 20 - What changes can be made to the Strategy to help maximise positive impacts and minimise negative ones on people experiencing fuel poverty and other vulnerable groups?

The number of respondents answering Question 20 is set out below, with 72 respondents, or 40% of all respondents, answering.

Table 23

Question 20: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	4	6%
Consultancy, Training, Assessment or Accreditation	13	5	7%
Consumer Advice, Advocacy or Campaigning	8	6	8%
Energy Generation, Supply or Distribution	20	9	13%
Housing Association	9	6	8%
Individual or Tenant Group	15	3	4%
Local Authority	23	13	18%
Product Manufacturer, Supplier or Installer	19	8	11%
Professional or Representative Body (Energy)	15	4	6%
Professional or Representative Body (Other)	21	7	10%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	4	6%
Total	178	72	100%
% of all respondents commenting		40%	

Comments tended to identify issues that need to be focused on, or possible further actions that could be taken, rather than distinguishing between maximising positive impacts or minimising negative impacts. Many of the issues raised reflected those highlighted at previous questions including that any cost impacts of the transition should not drive more people into energy poverty and that the transition to low/zero emissions heating should be delivered alongside a pre and post-install package of support involving behavioural advice, adoption of smart technology, tariff selection, and energy efficiency measures.

Research, information and engagement

Ensuring that the evidence base is accurate and up to date was described as critical and it was suggested that further research should be undertaken to understand the barriers faced by fuel poor households, and particularly vulnerable groups, when navigating through the many transition options available.

In terms of informing the Strategy, and information that should be set out within the Strategy document, comments included that the Strategy should clearly outline the social and environment differences that influence island, rural and urban fuel poverty.

It was also suggested that a fuel poverty identification plan needs to be developed; this should include a toolkit for use by practitioners to determine quickly if a household is living in fuel poverty. Identification is vital to ensure that fuel poverty schemes in Scotland are adequately targeted.

Ensuring that the views and experiences of those experiencing fuel poverty, in other vulnerable groups and in the organisations who represent them are sought and considered was also seen as key.

Priorities for action

Other comments addressed possible areas that should be prioritised for action or given an early focus. These included:

- Rural and islands communities. Any intervention needs to be rural-proofed to ensure a two tier system where rural traditional buildings and their occupants are left behind does not develop.
- Off-gas grid homes and the least able to pay.
- Areas in (extreme) fuel poverty.
- Areas of multiple deprivation. A specific 'deep retrofit' budget for the most deprived areas was proposed.

COVID-19

A number of respondents highlighted the need to consider the impact of COVID-19, and that in the context of the Strategy, impacts could be twofold:

- Impact on livelihoods and lifestyle, with direct consequences for households in terms of demand for and ability to afford heat.
- The shift towards greener, more affordable heat will be at the forefront of the economic and social decision making processes of local government.

In terms of how the impact of COVID-19 could or should be reflected in the Strategy, comments and suggestions included:

- The Scottish Government should consider the timescales for some of the key changes to allow households to stretch their COVID-impacted budgets further.
- Some agencies have been unable to continue to deliver services and support due to the impact of the pandemic. The Scottish Government should ensure there is adequate support to such organisations.

Other suggestions

Other suggestions for possible changes that could be reflected in the Strategy included:

- Making sure the design of fuel poverty schemes helps maximise the proportion of those in need who are reached. It was reported, for example, that recent research has revealed that less than a third of people in Scotland who were eligible for the Warm Home Discount actually received it. It was noted that some schemes (including the Winter Fuel Payment and the Cold Weather Payment) are in the process of being devolved and this was seen as presenting an opportunity to make sure they are designed to better target households experiencing fuel poverty.
- Adding an extra step to any property assessment for households in fuel poverty – this could look at ways to reduce any demand wastage and improve comfort.
- Recognising the scale of the opportunity in terms of creating employment. If properly structured then the building work needed could help address the poverty side of 'fuel poverty', and there could be targeting of the employment opportunities created by the Strategy at those seeking work.

Chapter 4: Place

The consultation paper notes that the transition to zero emissions buildings may look different in different communities and will require approaches tailored to place. It will be important for local communities to shape and be involved in decisions about solutions that are most appropriate for their local area. The Local Energy Policy Statement sets out clear principles to guide local energy planning and community engagement.

Communities

The Scottish Government intends to explore the opportunity to integrate heat decarbonisation in community climate action initiatives and will support communities to work together to address, and champion, heat decarbonisation through the new Community and Renewable Energy Scheme (CARES) programme and work to understand further the models and solutions most appropriate for communities in Scotland.

Question 21 - What are your views on how we can support place-based deployment of zero emissions heat within our delivery programmes?

The number of respondents answering Question 21 is set out below, with 101 respondents, or 57% of all respondents, answering. Consumer Advice, Professional Body (Other) and Third Sector respondents were amongst those making more extensive comments at this question.

Table 24

Question 21: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	3	3%
Community Council, Trust or Group	6	6	6%
Consultancy, Training, Assessment or Accreditation	13	7	7%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	10	10%
Housing Association	9	4	4%
Individual or Tenant Group	15	8	8%
Local Authority	23	17	17%
Product Manufacturer, Supplier or Installer	19	8	8%
Professional or Representative Body (Energy)	15	7	7%
Professional or Representative Body (Other)	21	12	12%
Public Body	7	5	5%
Third Sector or Non-Governmental Organisation	14	8	8%
Total	178	101	100%
% of all respondents commenting		57%	

Value of place-based deployment

There was broad support, from across a range of respondent types, for a place-based approach with some respondents suggesting this will be key to meeting heat targets. The absence of a single, one-size-fits-all solution, a requirement for flexibility and the need to use of different approaches in different locations were all highlighted, including with respect to the differing needs of rural and urban communities and the challenges in remote, rural and island locations.

The importance of programmes being tailored to the make-up and needs of specific communities was also highlighted and the Energy Carer model proposed by the Rural Fuel Poverty Taskforce was suggested to offer a local, place-based approach which ensures appropriate, tailored solutions are implemented.

Among the advantages identified for a place-based approach were:

- Benefits of scale, converting areas rather than individual buildings.
- Opportunities for deployment of heat networks and of hydrogen for heat.
- Community engagement and buy-in from local stakeholders.
- Opportunity to build local supply chains and create jobs. Explicit reference to local business was suggested and it was argued that local hubs should promote education and technical skills which can be delivered locally.

The role of Local Heat & Energy Efficiency Strategies (LHEES)

The important contribution of LHEES to a place-based approach to deployment was highlighted, with Housing Association, Local Authority and Public Body respondents amongst those commenting on the requirement for co-ordination by local authorities and the planning system. Use of LHEES in identifying areas of priority and opportunity, as well as the heat zones was highlighted and, given the importance of this information, it was argued those LHEES that are completed should be implemented as soon as possible. (Timescales for LHEES implementation are discussed at Question 25.)

However, a current lack of resources, and a skills and knowledge gap within the public sector was highlighted, especially with regard to energy related planning matters and to assessment of heat network feasibility proposals.

The need for additional resources or greater powers for local authorities were suggested, with a further proposal that support should be kept under review. There was also support for Heat Network Partnerships in co-ordinating support for district heating.

It was also noted that the Strategy does not refer to Regional Spatial Strategies (RSSs) or Masterplan Consent Areas, both of which were suggested to have potential to support deployment of heat networks. Nor does it mention a role for the Place Principle which, it was suggested, could help overcome organisational and sectoral boundaries.

Community involvement

A community-orientated approach was welcomed, and the importance of community engagement highlighted, including via existing relationships with local advice organisations. Involvement of citizen assemblies, citizen panels and other forms of participatory decision making was also suggested. Schemes such as community-based heat network and renewable projects were suggested to have potential to empower communities or engender a sense of community.

Development of a local community engagement framework was suggested, and it was argued that guidance to ensure the involvement of local communities in decision making should be made available as soon as possible.

It was also suggested that communities will require significant external input and ongoing support and the need to provide funding or technical advice to local groups was highlighted, with financial support through schemes such as CARES suggested.

The need for partnership working between the public and private sectors was also suggested, for example whereby a community identifies an opportunity and energy utility companies bring the investment and delivery know-how, supported by third sector support agencies.

Zoning and heat networks

A zoning approach was also supported, and it was suggested development of LHEES, and the zoning process set out in the Heat Networks (Scotland) Act 2021 should work in tandem to identify the right heat decarbonisation solution for an

area. Other issues raised with respect to designation of areas as suitable for specific technologies included:

- To enable place-based deployment, more guidance on major decisions, such as where hydrogen may be deployed in the national grid gas network, is required.
- Installations to individual properties may be superseded in the future and it was argued initial deployment of heat pumps should be to off-gas grid properties.
- Care will be important to ensure to ensure that building level technologies are supported and encouraged in appropriate areas.

Comments in relation to heat networks included that local authorities own a significant proportion of local building stock, so can provide the critical anchor loads required for the successful deployment of heat networks.

Other elements seen as helpful included:

- A standard specification for networks to help local authorities and developers avoid problems in connecting to heat networks.
- A well-developed heat network operator supply chain.
- Support to explore commercial and joint venture opportunities to help support funding for large scale heat networks and the long-term operation and maintenance of these heat networks.

It was also argued that knowledge gained from residential heat networks could be extended to the commercial sector.

Demonstrator projects

Respondents suggested projects that might be undertaken to showcase the benefits of low/zero emissions heating. For example:

- The Scottish Government could provide financial support (additional to existing capital grants) for demonstration projects, such as district heat networks, as part of large-scale redevelopments.
- Decarbonisation of an entire off-gas grid settlement could be undertaken as a transition project to show what can be achieved, using a combination of solutions including energy efficiency retrofit and a small-scale heat network/ multiple shared-loop ground source heat pumps and the installation of domestic heat pumps. Such a project was also suggested to provide an opportunity to explore possible governance arrangements and delivery approaches.

Funding

In addition to general comments regarding the requirement to fund local authorities and community groups, additional points in relation to funding mechanisms included that:

- Innovative financial mechanisms will be needed to support demonstration and more rapid deployment of solutions and might include blended models of

support providing ‘patient capital’ in the form of a mix of grants/loans and equity where applicable. Assistance and support to project developers to assist in navigating the funding landscape was also suggested.

- Targeted funding for place-based interventions needs to include revenue funding to allow for the people and skills development required to support place-based approaches.
- CARES thresholds for feasibility funding are restrictive and need to be reviewed.
- Eligibility for public funding for community schemes could include a requirement to promote and support wider community uptake of energy efficiency and low/zero emissions heat measures.

Other issues

Other aspects highlighted as important for place-based deployment included:

- **Driving progress:** Creation of a role (either independently or within a stakeholder organisation) for someone to initiate and maintain contact and drive project delivery, was suggested.
- **Data:** Planning place-based projects was observed to require data relating to housing (energy efficiency, building typology and age) to be correct and to be updated on a regular basis. It was also suggested that data relating to grid capacity and constraints needs to be made more readily available and that data for the non-domestic sector needs to be improved.
- **Grid capacity:** The need for a focus on adequate grid capacity was highlighted and it was suggested lack of capacity has impeded some previous community projects.
- **Visual impact of installations:** It was argued that installations should take account of the character of places, and that concerns with regard to visual impact should not be restricted to historic environments and conservation areas.

Question 22 - What is your view on how best to engage, and support, local communities in the planning and implementation of the heat transition in their area?

The number of respondents answering Question 22 is set out below, with 96 respondents, or 54% of all respondents, answering.

Table 25

Question 22: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	6	6%
Consultancy, Training, Assessment or Accreditation	13	7	7%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	10	10%
Housing Association	9	5	5%
Individual or Tenant Group	15	10	10%
Local Authority	23	17	18%
Product Manufacturer, Supplier or Installer	19	5	5%
Professional or Representative Body (Energy)	15	4	4%
Professional or Representative Body (Other)	21	9	9%
Public Body	7	6	6%
Third Sector or Non-Governmental Organisation	14	10	10%
Total	178	96	100%
% of all respondents commenting		54%	

There was support for the focus on local communities including a suggestion that a clear role for communities should be defined within the LHEES process, as for Distribution Network Operators (DNOs) and delivery partners. The importance of collection and interpretation of data across a diverse range of groups, needs and geographical locations was also highlighted, as was the need for plans to be informed by strategic and evidence-led analysis.

Engagement

General points included the importance of early engagement with a clear framework of engagement to ensure local communities are involved in the decision-making process. The importance of ensuring communities are part of the process so that heat transition happens with them, not to them was emphasised. Targeting engagement to specific local areas and to defined audiences was suggested, as was use of a range of methods to ensure all members of the community are included. Factors such as age, mobility and digital literacy were all cited in this respect. Tailoring engagement to the concerns and history of local communities was also proposed.

In terms of gaining the trust of the community, working with trusted local partners was suggested, including to avoid any perception that a scam is being promoted. Organisations suggested to have a role included: established community groups including local voluntary groups and environmental groups; community anchor

organisations; faith groups; ethnic minority groups; community councils; social landlords/housing associations; and tenant associations. A frequently made suggestion was that advice services and charities – both local and national – as well as existing local authority communication networks established through production of LDPs or LPPs, offer useful channels for community engagement. Local Authority respondents were most likely to have made this point.

General points on communication of messages included that information must be presented in an easy, user-friendly way so communities can successfully engage with the net zero agenda. The importance of education and raising awareness of both the reasons for decarbonising heat and the potential benefits for communities was highlighted. It was suggested that this should also include the potential consequences in the local area if climate change is not tackled.

The value of transparency with respect to both the benefits and the possible negatives was highlighted, and such transparency was suggested important to build trust by recognising the community as valued stakeholders. The need for communication to be a two-way process was also highlighted, with an argument that it will be important to listen to the community.

In terms of physical works, the importance that communities are able to trust the relevant parties was noted, and experience of previous, poorly-executed insulation work seen to have been driven by profit was reported to have undermined confidence. A not-for-profit approach involving skills development and employment for local people most in need was suggested.

The need for strategic plans to be sufficiently flexible that a range of options can be put forward to communities was also highlighted as being important to maximise engagement, enable a plan to genuinely respect local context and engender a sense of ownership amongst citizens.

With respect to the methods that might be used to engage with communities, suggestions included:

- Printed leaflets mailed to households. Leaflets and posters in community hubs such as GP surgeries, libraries and cafes.
- Social media and other online engagement including government websites.
- Local press and television.
- Heat champions who can engage with community groups.
- Providing speakers at community group meetings. Asking MSPs to engage with local groups.
- Events such as focus groups and workshops. Demonstration of the local benefits of heat decarbonisation, for example through case studies or site visits.
- Decarbonising school heating and involving the children. Accelerating the decarbonisation of community buildings to ensure that the local community can see low/zero emissions heating in practice first-hand, particularly in rural, off-gas communities.

- Using examples of good practice from existing programmes. Development of the CARES 'Knowledge Sharing Portal' showcasing relevant and current best practice was suggested and it was argued that exemplar projects with strong and inspiring community stories can be a powerful engagement tool.

Excitement within the creative industries about the role they could play in communicating the energy transition was also highlighted.

Other ideas with respect to routes for engagement included:

- Developing a toolkit to support communities to conduct robust local energy planning, supplemented with specialist support.
- Creating a Digital Twin of the area as an interactive tool to assess information and facilitate decision making.
- Working with energy suppliers to consult and discuss options with their existing customers.

A recent report on conducting best practice and successful engagement with communities was referenced.

Support

The need to provide appropriate support and advice for communities was also highlighted. Funding was referenced, with a request for longer-term funding to community organisations. It was argued that the current funding landscape lacks clear and transparent eligibility criteria that can be easily operationalised at scale and does not reflect realistic timescales for planning and delivery of schemes.

Suggestions included:

- A national framework through which guidance and funding is available from the Scottish Government, to ensure parity in engagement across the country.
- A streamlined and transparent funding mechanism that is centrally coordinated.
- Support via programmes such as CARES. including a heat-specific CARES programme.
- A body equivalent to the Rural Fuel Poverty task force to oversee the specialist low/zero emissions transition in remote rural Scotland.

With respect to the type of support that will might be needed, specialist advice and expertise and project management skills were all highlighted. Ideas included:

- An energy tsar for each local authority to liaise with local groups and project manage retrofit of local authority buildings.
- Publicly funded consultants on the ground in local areas to coordinate what is a complex process for the individual house or business owner.
- A dedicated support network for each settlement operating pre-, during and post any settlement scale transition.
- Independent project managers.
- Free planning engagement in early developmental stages.

- Support from rural estates to help their local communities research and develop projects. Estates might also be able to host district-heating schemes.

The value of shared experience was also highlighted, with suggestions for creation of new networks for anchor organisations or like-minded communities to share ideas, experiences and learning. The benefits of collaboration and learning across local authorities, and other key actors such as higher and further education establishments were also suggested.

Question 23 - What role do you think community anchor organisations could play in supporting the heat transition?

The number of respondents answering Question 23 is set out below, with 81 respondents, or 46% of all respondents, answering.

Table 26

Question 23: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	6	7%
Consultancy, Training, Assessment or Accreditation	13	4	5%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	9	11%
Housing Association	9	5	6%
Individual or Tenant Group	15	8	10%
Local Authority	23	15	19%
Product Manufacturer, Supplier or Installer	19	5	6%
Professional or Representative Body (Energy)	15	4	5%
Professional or Representative Body (Other)	21	6	7%
Public Body	7	5	6%
Third Sector or Non-Governmental Organisation	14	7	9%
Total	178	81	100%
% of all respondents commenting		46%	

There was widespread agreement, from a broad range of respondent types, about the central role community anchor organisations (CAOs) can play in supporting heat transition. This included references to the key role such trusted local organisations can have, particularly in close-knit communities, or those who are otherwise hard to reach. Several examples of specific projects were referenced, including: the Coalburn One Stop Shop; the involvement of the Shapinsay

Development Trust in recent BIG HIT project activities; and the work of South Side Seeds in Glasgow.

The potential of CAOs to reach a large audience and to bridge the gap between national organisations, local authorities and individual citizens was highlighted. Underlining the knowledge CAOs have of their local communities, it was suggested it will be important to consult with these organisations before undertaking local engagement activities, for example to ensure messaging is appropriate, and that they can also have a key role in mapping, since they will know where vulnerability lies within a community. The importance of establishing a partnership working ethos was also suggested.

Some respondents appeared to refer to community organisations in a rather wider sense than that described in the consultation paper, where CAOs are described as organisations controlled and owned by local people. One Individual respondent who thought an organisation with which they were involved might be a CAO suggested the Scottish Government could help by identifying relevant organisations and sharing a priority task list with them.

A very small number of respondents thought CAOs should not have a role in supporting heat transition.

Potential roles for community anchor organisations

Suggested opportunities included:

- Raising awareness and acting as ‘heat champions’, advocating change within communities. Examples of potential activities included organising talks and events such as workshops. This awareness raising role was the most frequently made suggestion and was made by a range of respondent types.
- Gathering and collating localised information (such as on local views and challenges).
- Disseminating information, signposting opportunities and providing advice to the community.
- Demonstrating and promoting the benefits of new technologies, including by providing case studies based in the community.
- Community organisations that own buildings acting as demonstrator projects. It was suggested a CAO connecting to a local heat network could encourage others to follow suit.
- Acting as agents on behalf of those who may not be able to navigate grant application systems or administering grants on behalf of the wider community.
- Leading community buying schemes, to achieve economies of scale by bulk purchasing of goods or services to improve quality and reduce costs. Co-ordinating retrofit schemes using local installers.
- Developing and leading projects, potentially including operating local heat networks. Benefits of community partnerships with commercial energy service companies were also suggested. This was also a frequently made suggestion

and was most likely to have been suggested by Local Authority or Third Sector respondents.

- Distributing the renewable options and funding streams available for the wider community.

CAOs were described as an excellent asset on which to build support of a just transition and it was argued they should be integral to the design and oversight of LHEES approaches. However, it was also noted that such organisations exist in varying forms across different communities, so a uniform approach may not be feasible. It was also observed that different community organisations will have different aspirations and that care should be taken to ensure that anchor organisations with a clear local agenda do not feel that the energy agenda is being pushed upon them.

Other organisations suggested to have potential roles as community anchors included social landlords such as Community Based Housing Associations, community councils and universities.

Support required by community anchor organisations

A number of respondents, from across a range of respondent types, also commented on the support CAOs will need including in terms of funding. Time was also thought to be a limiting factor, particularly for organisations staffed solely by volunteers.

It was argued that CAOs will need:

- Capability building to address any potential gaps in technical knowledge and skills.
- Professional technical, legal and procurement expertise. It was suggested assistance will be needed to ensure projects are technically and economically viable and that organisations may need support to engage with experts in design and delivery of community energy strategies.
- Ways to share risk for operation and maintenance that reduce cost and improve resilience for district heat networks.

It was suggested that support might be provided by Home Energy Scotland, and it was reported that the Energy Consumers Commission has committed to establishing a grass-roots network which could provide an opportunity to share ideas and feedback on engagement policy.

From a rather different perspective, an organisation that has attempted to establish a local heat network in a remote location expressed frustration at what they felt to be the current failure to listen to community organisations and argued that there needs to be a change in approach on the part of government.

It was also observed that, to ensure it represents the wider community as well as the views of its members, a CAO needs to engage with the wider community, and a number of CARES-funded Community Action Plans that aim to seek a community mandate were noted.

Question 24 - In your opinion, what steps can we take to ensure that policies set out in this strategy do not unfairly impact Island and other remote communities?

The number of respondents answering Question 24 is set out below, with 77 respondents, or 43% of all respondents, answering.

Table 27

Question 24: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	3%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	4	5%
Consumer Advice, Advocacy or Campaigning	8	6	8%
Energy Generation, Supply or Distribution	20	8	10%
Housing Association	9	4	5%
Individual or Tenant Group	15	8	10%
Local Authority	23	13	17%
Product Manufacturer, Supplier or Installer	19	6	8%
Professional or Representative Body (Energy)	15	6	8%
Professional or Representative Body (Other)	21	5	6%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	8	10%
Total	178	77	100%
% of all respondents commenting		43%	

Some respondents welcomed acknowledgement of the challenges faced by remote and island communities. Others referenced the importance of an Islands Impact Assessment to assess and mitigate risks, inform development of appropriate policies, and ensure equality in relation to the specific challenges faced by island communities. Conducting an assessment at an early stage and allowing all three island authorities to contribute was proposed. Other suggestions included that:

- Policies should be rural proofed at an early stage.
- A full Equality Impact Assessment should be carried out.
- The forthcoming National Planning Framework (NPF4) is likely to provide spatial priorities and influence capital investment to support island and remote communities.

The need for the Strategy to recognise that island and remote rural areas have different needs to urban areas and to avoid a one-size-fits-all approach was

emphasised, with respondents calling for policies to be flexible or for support programmes to be flexible.

There was a suggestion that either exemptions or financial assistance should be provided but also a view that the approach should be to make additional support available rather than lowering standards.

Challenges for island and other remote communities

It was noted that island and other remote communities typically have high levels of fuel poverty. A high proportion of homes were reported to be detached, traditionally constructed, and hard to treat. Many properties were suggested to be in a poor state of repair, to have minimal insulation, inefficient heating and poor energy efficiency ratings, to be off-gas grid and not likely to participate in heat networks.

It was also noted that low/zero emissions heat alternatives are only suited to those homes that have already had fabric repairs and upgrades to insulation, and the importance of adopting a whole house approach to improved energy efficiency was highlighted.

Higher construction costs and limited supply chains in island and remote areas were reported to increase the cost of installing energy efficiency measures and higher costs for repairs and maintenance were also highlighted.

The higher cost of electricity in remote parts of Scotland was also referenced and suggested to be unfair since much of Scotland's renewable electricity is being generated in these areas. It was argued to be important that residents do not feel their areas are being used mainly to benefit urban areas without anything in return. Limitations of existing electrical infrastructure were also suggested to create a challenge or present barriers to implementation of measures. Increased risks for remote communities if there are major disruptions on the electricity network when heat in buildings is reliant on electricity were also highlighted.

Suggested actions

Financial support: There were calls for additional funding for installation of measures and also for heat network feasibility proposals. While uplifts to existing funding programmes were welcomed, it was noted that these do not come close to covering additional costs of larger measures such as external wall insulation. A specific Rural Homes Transition Package was proposed to help provide extra support to address the additional costs and difficulties of achieving heat transition in rural areas. There was also a call for continued attempts to have the flat grant rate of the Clean Heat Grant (CHG) revisited to make this reflect regional cost differences.

It was also argued that some island communities have been early adopters of low/zero emissions heating options but that this means higher up-front and lifetime costs for consumers who will not benefit from a mature market and supply chain. A grant fund to offset these costs for rural and island communities was proposed.

A regional focus, such as concentrating on certain locations at a time or facilitating bulk buying, was suggested as a way of mitigating unfair impacts on remote and island communities.

Supply chain: The importance of supporting the local supply chain, and commitment to developing skills were also highlighted. In addition to supporting the local economy and creating jobs, the advantage of a local supply chain in providing local redress if any works need to be made good was noted.

Alternative solutions to finding contractors and controlling costs included: incentives for installers to work in remote areas; and preventing suppliers charging different prices based on location.

Related to both funding and support for supply chains, it was argued there must be action to ensure PAS 2035 or TrustMark accreditation does not unfairly impact remote communities. Previous situations where rural communities could not access accredited installers or preferred to use trusted local but non-accredited businesses and hence were unable to access funding were highlighted. Integrating PAS 2035 and TrustMark standards into training programmes was suggested as a means of ensuring staff would be accredited once trained and reducing pressure on SMEs to pay for accreditation.

Electricity costs: Localised tariffs and storage solutions that help minimise curtailment of renewable energy systems by rewarding local demand side response were recommended and, although establishing tariffs for locally generated electricity was suggested to have proved challenging, it was argued to be an area which should be considered in more detail.

Engaging and listening: Challenges for effective engagement were referenced with suggestions that there should be direct engagement, pro-active engagement or effective communication at all levels. Examples included making sure communities are represented on steering groups at senior level.

The importance of early engagement and of bottom-up engagement were highlighted - listening to rural and island communities and engaging in genuine partnership working. In contrast, some recent experience was felt to reflect a more directive, top-down approach. Some respondents expressed a feeling that geographically distant decision makers have poor understanding of local issues, or that island proofing may be ignored in a centralised policy delivery. Using local advice organisations for tailored engagement with their own communities was proposed.

Also in relation to working with communities, continued availability of and work through CARES was requested.

Providing and sharing information: Opportunities to share best-practice information and ideas between islands or different remote areas were suggested and that the centralised resource planned to support local authorities in LHEES development might also be used in this respect. Specifically, it was suggested that it might be useful to share and build on research evaluating existing mini/micro grids, not connected to the utility network.

With respect to providing information to individuals, it was suggested that advisors within Home Energy Scotland and other advice organisations should specialise in the potential solutions and funding available for island and remote communities. The importance of using local knowledge and delivery experience was also highlighted.

Local Heat & Energy Efficiency Strategies

The consultation paper states that LHEES will be at the heart of planning a place based, locally-led and tailored approach. Once in place these local strategies will provide a framework for taking an area-based approach to heat and energy efficiency planning and delivery. Draft guidance and a methodology to underpin and support the development of LHEES will build on learning from the recent LHEES pilots and will be subject to consultation. The intention is to introduce legislation to establish LHEES on a statutory basis, and for LHEES to be in place for all local authority areas by the end of 2023.

Question 25 - What is your view on the timescales proposed for LHEES?

The number of respondents answering Question 25 is set out below, with 81 respondents, or 46% of all respondents, answering.

Table 28

Question 25: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	4	5%
Consultancy, Training, Assessment or Accreditation	13	4	5%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	9	11%
Housing Association	9	7	9%
Individual or Tenant Group	15	6	7%
Local Authority	23	17	21%
Product Manufacturer, Supplier or Installer	19	9	11%
Professional or Representative Body (Energy)	15	4	5%
Professional or Representative Body (Other)	21	5	6%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	5	6%
Total	178	81	100%
% of all respondents commenting		46%	

Many respondents, from across a broad range of respondent types, agreed with the proposed timescales, which were described as ambitious but also achievable. It was suggested short timescales will ensure that a greater number of building owners will have confidence that their investments in both low/zero emissions heat and energy efficiency measures are consistent with the applicable LHEES.

Some respondents, also from across a range of respondent types, suggested timescales should be shorter or that LHEES should be in place as soon as possible, including because the planned timetable will leave some local authorities only a relatively short time to achieve the carbon neutral status set out in their own climate emergency plans or that investment is likely to be delayed until the LHEES are completed. It was also argued that moving more quickly should be permitted with the possibility of implementation on a rolling basis suggested. One Local Authority respondent noted their own intention to include the LHEES within their Climate Action Plan which they intended to produce ahead of the proposed deadline, seeking assurance that this is an appropriate approach. A specific suggestion was that the end of 2023 date could be brought forward by a year or 18 months, to coincide with new Public Bodies Duties reporting requirements.

In contrast, others considered the end of 2023 date to be too soon, over optimistic, too ambitious or not deliverable. They included Community Council, Individual and Professional Body (Other) respondents. Among reasons given by respondents taking this view was that:

- The proposed timetable will rely on decisions being made in advance of sound information on which to base them.
- More time is required at the scoping and planning stage to ensure that the correct decisions are made both in terms of projects and investment.
- Given the information that must be gathered, and the research, consultation and engagement needed to achieve the aims set out in Scottish Government guidance, it would be more reasonable for the strategies to be produced by 2025.

Irrespective of their view on the timescales, many respondents, including a number of Local Authority or Public Body respondents, highlighted the significant resources and guidance that local authorities will require. It was argued that an assessment identifying the full cost for undertaking the necessary work stream should be undertaken in partnership with Councils prior to establishing LHEES on a statutory basis. A lack of resource within local authorities was reported to have been a common theme across many pilot projects.

In addition to the significant work involved for local authorities, the time necessary to consult with the local community was highlighted. As a related point it was suggested that, to avoid potential for confusion involving production of LPPs, LDPs, and LHSs, consideration should be given to integrating plans.

Potential uncertainty with respect to other elements of the Strategy – for example potential for connection to a zero carbon gas grid was also raised.

Pilots and their evaluation

Some respondents commented on aspects of the LHEES pilots or their evaluation including a view that meeting the 2023 timescale requires the pilot programme to be evaluated in a timely and effective manner. It was also suggested that:

- The timeline for the LHEES pilots means it will not be possible to carry out a full evaluation prior to the introduction of legislation by the end of 2023 or that there will be limited time for LHEES development by the end of 2023.
- For those involved in phase 3 pilots the timescale may be difficult.

However, an alternative perspective was that, since that evaluation of the phase 1 and 2 pilots is complete, the phase 3 evaluation, along with the evaluation of the whole process, could be reported sooner than envisaged.

The Scottish Government was encouraged to implement the recommendations made in evaluation of phase 2 pilots, including in relation to identifying relevant sources of data and data gaps. Commitment to early creation of a central resource for data access and analysis was proposed.

LHEES guidance and methodology

It was argued that LHEES guidance should be issued at the earliest opportunity and should be produced in collaboration with COSLA and local authorities. While it was acknowledged that having a methodology to follow will make a considerable difference to the speed of the LHEES process, it was argued that there must not be a 'one-size-fits-all' approach, but rather a central strategy that regions can take forward to suit their specific requirements and create a local focus.

As noted above, there will be further consultation on the draft methodology for LHEES and some respondents stressed the importance of this process. It was also suggested that clarity is needed on how and when community partners will be consulted on LHEES and it was reported that, with few exceptions, NHS Boards have not been consulted on LHEES.

Other comments:

Further comments on LHEES in relation to other plans and strategies included that:

- With respect to investment cycles in both public and private sectors there should be alignment between LHEES and NPF4, LDPs and their delivery programmes, and emerging RSSs.
- There are opportunities to transition to LHEES via existing funding programmes such as HEEPS:ABS, LA Flex, the Low Carbon Infrastructure Transition Programme and the Public-Sector Decarbonisation Fund.

Question 26 - Do you agree with the approach to LHEES set out above? If not, please give reasons to support this.

Responses at Question 26 by respondent type are set out below.

Table 29

Question 26 - Do you agree with the approach to LHEES we have set out?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	0	1	1
Community Council, Trust or Group	2	2	4
Consultancy, Training, Assessment or Accreditation	5	1	6
Consumer Advice, Advocacy or Campaigning	5	0	5
Energy Generation, Supply or Distribution	10	3	13
Housing Association	5	1	6
Individual or Tenant Group	6	0	6
Local Authority	15	0	15
Product Manufacturer, Supplier or Installer	8	0	8
Professional or Representative Bodies (Energy)	4	1	5
Professional or Representative Bodies (Other)	7	1	8
Public Body	3	1	4
Third Sector or Non-Governmental Organisation	6	1	7
Total	76	12	88
Total %	86%	14%	

Among respondents who answered the closed question, a clear majority – 86% – agreed with the approach to LHEES set out in the consultation paper, while 14% disagreed.

The number of respondents making a further comment at Question 26 is set out below, with 82 respondents, or 46% of all respondents, answering. Academic, Local Authority and Public Body respondents were amongst those making extensive comments at the question.

Some of those commenting had not answered the closed question but indicated broad agreement with the proposed approach while also referencing specific concerns, and some who agreed at the closed question also went on to place conditions on that agreement.

Table 30

Question 26: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	3	4%
Community Council, Trust or Group	6	5	6%
Consultancy, Training, Assessment or Accreditation	13	4	5%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	12	15%
Housing Association	9	7	9%
Individual or Tenant Group	15	5	6%
Local Authority	23	15	18%
Product Manufacturer, Supplier or Installer	19	5	6%
Professional or Representative Body (Energy)	15	3	4%
Professional or Representative Body (Other)	21	8	10%
Public Body	7	5	6%
Third Sector or Non-Governmental Organisation	14	6	7%
Total	178	82	100%
% of all respondents commenting		46%	

Proposed approach

General comments included a view that the proposed approach seems reasonable or is an appropriate mechanism given the area-based nature of technologies such as heat networks and will provide clarity on the approach to be taken in a local area.

It was also observed that LHEES are focused on heat decarbonisation and energy efficiency, rather than taking a whole-systems view and that, while LHEES should not prevent wider planning, it will be important to ensure that solutions are not considered in isolation. A more integrated or holistic approach was also proposed – for example considering the impact of other demands such as transportation on energy supply, and the need to plan for generation, transmission and storage. Inclusion of electrification of transport within LHEES was proposed in particular. Taking a whole system approach was also suggested to provide other opportunities, such as in relation to heat exchange from industrial sites.

A further suggestion was that a stepped approach to planning from national, to regional to council and then more local/micro levels might be useful and would link with the approach in other Scottish policy areas.

Other comments on the proposed approach included that:

- LHEES plans will need to align between bordering local authorities to ensure that boundaries do not create inconsistent approaches – for example in respect of heat networks that cross boundaries.
- A group set up to co-ordinate and pass on lessons learned between local authorities could help develop best practice and avoid unnecessary mistakes and could also be used to coordinate situations such as heat networks that cross local authority boundaries.

Statutory footing

A number of respondents, from across a range of respondent types, noted their support for placing LHEES on a statutory basis. It was suggested that this will enable local authorities to facilitate the delivery of the right solution in the right place. Without setting LHEES as a statutory duty it was argued that the ambitious targets in the Strategy are unlikely to be met. The commitment to working with COSLA was also welcomed. However, it was argued that consideration of energy issues is broader than LHEES and that Energy Plans should have the statutory footing and be coordinated/integrated with the work of development plans.

A review process within LHEES was also proposed, for example, to permit updates as local conditions change.

A view was also expressed that the proposed approach to LHEES places too much control with local authorities, and that more scrutiny is required to ensure all stakeholders are consulted. The importance of engagement with key partners, of taking robust, independent advice and of avoiding risk of political intervention was highlighted. Placing too much responsibility on local authorities was also suggested to risk a disjointed approach and inefficient duplication of effort.

Providing resources

Many respondents, from across a broad range of respondent types, highlighted the importance of adequate funding to local authorities, including for development as well as delivery. It was argued that local authorities are not currently equipped to develop and implement LHEES and that dedicated, specialist resources will be required including to ensure plans are delivered to a similar high standard across Scotland. A risk that LHEES may be outsourced or that consultants may produce 'academic' rather than 'practical' plans was also suggested. Among alternative solutions suggested were:

- Creation of an independent Scottish Energy Agency with expertise and resources for development and delivery.
- Potential for the Heat Network Partnerships (as described in Chapter 5 of the consultation paper) to support both LHEES development by local authorities, and project development and delivery.
- Clusters of local authorities working together where this would bring operational benefits. For example, smaller authorities, with little experience of any local energy planning could collaborate with regional authorities to share expertise and technical resources.

Local decision making

Respondents highlighted the importance of local decision making, including the need to recognise the challenges for individual local authorities, particularly in relation to development of large-scale solutions such as district heating. The specific challenges for rural and island communities were referenced.

With respect to involvement of local communities in decision making about the heat transition there was a suggestion that community consultation and awareness raising also should be a statutory part of the LHEES. Guidance to local authorities on the kind of engagement needed both during and after development of the strategies was suggested. It was also argued that failing to explicitly carve out a role for CAOs in the delivery of energy plans is a missed opportunity.

A consistent approach and a centralised resource

The importance of clear central direction and a consistent approach was a more frequently made point, with Local Authority, Product Manufacturer and Public Body respondents amongst those raising this issue. It was noted that some organisations operate across many local authority areas, and it was argued that greatly differing standards and practices could make retrofitting all Scottish stock a more challenging process. It was also suggested that homeowners and lenders will want to see national consistency in the application of regulations.

Creation of a centralised resource that local authorities can draw on to support access to the data and analysis needed to underpin authority-wide strategies was supported. However, it was argued that, for a data-led approach to be suitable the data must be accessible, accurate and properly understood and that significant support to local authorities will be required to address existing shortcomings. A nationally co-ordinated data gathering exercise to ensure data is uniform across Scotland was also suggested and it was noted that the evidence base will need to be able to support local delivery programmes and have buy-in from local authorities through appropriate governance structures.

Establishment of a common information register that standardises LHEES outputs and clearly shows the local strategies was also encouraged.

Involvement of network operators

The consultation paper states that LHEES will support planning for the energy networks and, over time, will become an important evidence base for both the electricity DNOs and Gas Distribution Networks (GDN), and will support the Local Area Energy Planning approach being considered by the regulated energy networks sector.

Some respondents supported consideration of local circumstances in planning energy networks and the involvement of DNOs. It was argued there should be a two-way process between local authorities and network operators so that while LHEES inform network planning, network infrastructure and capacity also informs the solutions in LHEES.

However, there was also a view that DNOs and GDN operators should not be given a major role, with research evidence reported to show such organisations may use their involvement to slow progress in decarbonisation and further their own commercial interests.

Other points in relation to the involvement network operators included that the Scottish Government should:

- Continue to work with DNOs and Ofgem to ensure that DNOs are adequately funded to allow for the resourcing requirements that can enable the level of support that is required by local authorities in developing LHEES.
- Go beyond the grid and network companies and include the fuel distribution sector in planning.

It was also suggested Local Area Energy Plans could be used in tandem with LHEES to add value in nontechnical aspects such as local skills and supply chains. Exploring how the LHEES approach can be combined with scenario modelling to identify low-regret options for zoning, and to help stakeholders understand cost and carbon emissions implications was suggested.

Zoning

Comments on zoning included that this should operate under a no-regrets first basis, with areas that are clearly not going to be connected to future technologies invested in first. However, it was also argued:

- An iterative approach looks more practical, given the uncertainties over energy supply options and what is a low and no regret option.
- All LHEES must plan for decarbonisation solutions that exist at present, in the event new technologies such as hydrogen do not become available after 2030.
- Mandating technology solutions in certain locations could limit investment in other technologies and their supply chains.

If a local authority is to zone an area for a particular measure, then it was suggested the Government needs to provide support - either with incentives for building owners or with enforcement to comply.

There was support for the concept of heat network zoning, provided initiatives are applied to avoid the risk of creating a patchwork schemes that are not interoperable. Successful delivery of zones was suggested to require collaboration among the key local stakeholders and energy producers/users (including DNOs, heat network providers, private investors and public authorities). However, a potential impact on landowners was suggested in areas where development land values are marginal, since a potential developer might not be willing pay market price for the land in view of the costs of setting up a heat network.

Other points on heat network zones included that:

- Consideration should be given to the staged development of heat networks in a heat network zone so that future evolution of a heat network is optimised for maximum efficiency and least disruption.
- Local authorities should be provided with adequate resources and skills and be facilitated to engage with the private sector to appropriately assess, identify and implement LHEES and heat networks zones.
- Clarification is needed on the relationship between LHEES, planning policy for heat networks in NPF4, and the provisions of the Heat Networks (Scotland) Act 2021.

Scotland's Planning System

The consultation paper explains that, for homes, Permitted Development Rights (PDR) are already granted, to some extent at least, for a range of technologies including: biomass heating systems; ground and water source heat pumps; and air source heat pumps. For non-domestic properties, PDR often allow for installation of a range of low and zero emissions heating technologies, including solar panels and ground and water source heat pumps. A review of PDR currently in progress is considering extension of existing PDR for heat networks and micro-renewable technologies.

While PDR do allow for the installation of zero emissions systems in many cases, there are circumstances where the size and scale of installation may still require planning permission, as well as within designated places such as conservation areas, World Heritage Sites, or where limitations or conditions attached to PDR for the particular technology cannot be met. Listed building consent is required for any external and internal works to a listed building which affect its historic fabric.

Question 27 - What are your views on what Permitted Development Rights might help enable in the heat transition, in addition to those we have already included in the Permitted Development Rights review programme?

The number of respondents answering Question 27 is set out below, with 79 respondents, or 44% of all respondents, answering.

Table 31

Question 27: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	7	9%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	10	13%
Housing Association	9	6	8%
Individual or Tenant Group	15	5	6%
Local Authority	23	12	15%
Product Manufacturer, Supplier or Installer	19	6	8%
Professional or Representative Body (Energy)	15	6	8%
Professional or Representative Body (Other)	21	12	15%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	6	8%
Total	178	79	100%
% of all respondents commenting		44%	

A number of respondents, from a range of respondent types, noted their support for the review of PDR, including because they expected the proposed extensions to help to support delivery of the Strategy. As a general point it was suggested deployment of conventional fossil fuel systems should not benefit from PDR when some low/zero emissions technologies do not. Some respondents expressed more limited support – for example for extension of PDR to small scale or uncontroversial developments, or only where it will not cause an unintentionally adverse impact on built, cultural and natural heritage, environment, landscapes and biodiversity. There were also significant reservations about the proposed changes, particularly with respect to listed buildings and conservation areas.

Benefits of extended PDR

In addition to helping to deliver heat transition, other benefits of the proposed extensions to PDR were suggested to include:

- Reducing the burden on planning officers who could otherwise struggle with the volume of applications. However, it was also noted that any need to seek formal clarification that works are within scope will create work for relevant authorities and also that clarity on what is permitted is key to prevent recourse to limited enforcement resources.
- Reducing time and costs for those looking to upgrade properties. It was suggested PDR should be structured to reflect archetypes to enable

decarbonisations works within scope to proceed at lower cost and greater speed.

- Encouraging investment in low and zero emissions heat networks and micro-renewable technologies and encouraging connection to existing networks.

It was also suggested that further information on how extended PDR will link in with existing planning arrangements would be beneficial, as would consistency with the regulations of other administrations.

Monitoring outcomes was also proposed, and that PDR should be revised again in the event of unintended detrimental effects.

General criteria suggested for PDR to apply included:

- A whole house approach should be taken to promote the take up of low/zero emissions solutions.
- Installation of a low/zero emissions heat technology within the boundary of an organisation's estate, and subject to adherence with other environmental legislation.

Heat networks

A number of respondents, from a range of respondent types, specifically welcomed extension of PDR for heat networks. It was suggested that the proposed change will bring heat networks in line with other utilities, although it was also noted that gas and electricity regimes have not been reviewed for some time and are not reflective of modern development practice. A possibility that the Strategy might conflict with the Heat Networks (Scotland) Act 2021 if it extends PDR without requiring that developers undertake community engagement was also raised.

Other comments on heat networks included that:

- Appropriate quality assurance mechanisms for new heat networks should be embedded.
- PDR might be appropriate for small heat networks if all participants understand what is being agreed.
- Once planning permission has been given for a heat network no further applications should be required for connections or extensions within defined boundaries, and that wayleave rights are much needed to reduce costs.

Micro-renewables

There was also a welcome for the proposed extension with respect to micro renewables, although beyond this there were few additional comments. It was suggested solar thermal should be included.

Heat pumps

There was a call for PDR to be extended to heat pumps for homes and non-domestic buildings and for this to include exploration of options for heritage sites and conservation areas.

Respondents also made specific suggestions with regard to:

- Size of heat pump installations in relation to both footprint and volume.
- Noise from heat pumps, including highlighting advances in the market with respect to noise reduction. Absence of clear guidance in relation to noise for heat pumps for tenement blocks was noted.
- Locations of heat pumps, which it was reported at present have to be significantly hidden from a building frontage if PDR are to apply.
- Specific types of installations – for example ground source heat pumps with shared ground arrays.

Concerns in relation to extending PDR

Some respondents expressed a view that current rights are sufficient and appropriate, and that PDR should be kept as they are, although it was not always clear whether these comments referred to the position before or after the ongoing review of PDR. It was also argued that relevant alterations will require a building warrant, so changes to PDR alone will have little benefit. Rather than extending PDR, it was suggested that what is needed is a faster, more cost-effective, well-resourced planning system.

Concerns were also raised with respect to possible aesthetic and safety issues and in respect of damage to the fabric of older, traditional housing. It was suggested that:

- Clear guidance or installation principles should apply to ensure no significant negative effects for neighbouring dwellings.
- Consideration of the visual impact of installations should not be confined to conservation areas.
- PDR must be balanced between not losing building cultural heritage and permitting required works.

Listed buildings, conservation areas and World Heritage Sites

The intention to work with Historic Environment Scotland and other stakeholders on how to enable the transition of historic buildings to zero emission heating was welcomed and it was suggested local authority conservation officers, and those with experience of managing heritage-led regeneration schemes should also be involved. Acknowledgement of the need to ensure change is sensitively managed in certain areas such as conservation areas and World Heritage Sites and for listed buildings was also welcomed, although it was argued this should be extended to other designated areas – for example National Scenic Areas and National Parks. In such areas, it was suggested the need for planning permission should be retained. It was argued PDR should not be expanded significantly unless with clearer guidance on appropriate interventions and, potentially, with design guidance.

Other respondents argued consideration should be given to extending PDR to heat installations in listed buildings, citing the number of such buildings that would otherwise require planning permission to install new heating systems. Statements in the Position Statement on NPF4 (for example in relation to places looking and

feeling different in the future) were also cited as providing a steer that restrictions in listed buildings and conservation areas should be lifted. Reviewing controls for conservation areas and listed buildings or otherwise ensuring carbon reduction targets are not derailed by such designations was suggested. Guidance on how best to support heat transition, even in conservation areas, was also requested.

Other points on listed buildings and conservation areas included that:

- Listed building consent may be required depending on what is proposed and permitted actions need to be specified clearly.
- Some conservation areas may already be affected by work not done within permission and local authorities should review whether the character of a particular location is already compromised, in which case a shift to PDR would not be unreasonable.
- In regeneration areas, the National Lottery Heritage Fund and Historic Environment Scotland require new proposals to be in line with conditions of the Conservation Area Regeneration Scheme and extension of PDR might impact this.

Additional suggestions

In addition to the existing and proposed PDR noted in the consultation paper, respondents suggested the following actions or additions:

- Review of the scale of development allowed within PDR, particularly for non-domestic installations.
- Review of the discretion of local planning departments to remove PDR. It was report that all PDR can be removed from new build developments meaning additional costs and delays to plans to convert to low/zero emissions heating systems.
- A PDR for the replacement of poorly performing homes with newly built ones on the same footprint. New building to current standards may be both more effective and less costly than some conversion projects.
- A similar PDR for demolition of agricultural and forestry buildings and replacement with net zero new buildings on the same footprint, subject to prior notification for design.
- PDR for modular plant buildings where they comply with locally set criteria to ensure minimal visual intrusion. It was suggested this would allow manufacturers to develop a compliant product rather than bespoke solutions.
- Extending solar PV PDR to 1MW as in England.

Chapter 5: Preparing our Energy Networks

The consultation paper notes that decarbonising heat will substantially change the way existing energy infrastructure is used and will influence where new infrastructure such as heat networks and additional generation capacity is needed.

The Electricity System

It is likely that the majority of heat demand that will need to convert to low and zero emissions heating by 2030 will switch to electric systems. Transitioning this number of properties to electric heating systems will substantially increase the demand on the electricity system.

Question 28 - In your view, is there further action that can be taken to ensure that our electricity systems are ready for heat decarbonisation? If yes, please provide further information.

Responses at Question 28 by respondent type are set out below.

Table 32

Question 28 - In your view, is there further action that can be taken to ensure that our electricity systems are ready for heat decarbonisation?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	3	0	3
Community Council, Trust or Group	5	0	5
Consultancy, Training, Assessment or Accreditation	6	1	7
Consumer Advice, Advocacy or Campaigning	5	1	6
Energy Generation, Supply or Distribution	13	0	13
Housing Association	5	0	5
Individual or Tenant Group	8	0	8
Local Authority	11	3	14
Product Manufacturer, Supplier or Installer	8	1	9
Professional or Representative Bodies (Energy)	7	1	8
Professional or Representative Bodies (Other)	7	1	8
Public Body	4	0	4
Third Sector or Non-Governmental Organisation	8	0	8
Total	90	8	98
Total %	92%	8%	

Among respondents who answered the closed question, a clear majority – 92% – thought that there is further action that can be taken to ensure electricity systems are ready for heat decarbonisation, while 8% disagreed.

The number of respondents answering Question 28 is set out below, with 95 respondents, or 53% of all respondents, answering. Academic, Energy Generation, Product Manufacturer and Professional Body (Energy) respondents were amongst those making extensive comments at this question.

Table 33

Question 28: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	4	4%
Community Council, Trust or Group	6	5	5%
Consultancy, Training, Assessment or Accreditation	13	6	6%
Consumer Advice, Advocacy or Campaigning	8	6	6%
Energy Generation, Supply or Distribution	20	13	14%
Housing Association	9	5	5%
Individual or Tenant Group	15	8	8%
Local Authority	23	14	15%
Product Manufacturer, Supplier or Installer	19	7	7%
Professional or Representative Body (Energy)	15	7	7%
Professional or Representative Body (Other)	21	8	8%
Public Body	7	4	4%
Third Sector or Non-Governmental Organisation	14	8	8%
Total	178	95	100%
% of all respondents commenting		53%	

A number of respondents, from across a range of respondent types, expressed support for the consultation paper in terms of the potential scale of increase in electricity demand, and the work required to respond to this. This included reference to decarbonisation of other sectors such as transport as adding to demand. It was also noted that the pace of heat decarbonisation across the rest of the UK will affect overall electricity demand across the UK grid. There was support for the Scottish Government taking a co-ordinated approach to decarbonisation of heat, including the interaction of the different technologies that may have a role to play for Scotland’s electricity systems.

However, the importance of the sequencing of actions in relation to electricity networks was noted and more detail requested. In this context, there was a recommendation that there should be an initial focus on energy efficiency and low/zero emissions heating systems for dwellings with direct electric heating, releasing network capacity and minimising network investment needed, while providing time for wider network reinforcements and minimising any impact on consumer confidence.

Generation requirements

In relation to generation requirements, there was support for the proposal for further analysis to better understand generation and network requirements. For some, this reflected concerns regarding the extent to which electricity networks will be able to meet the anticipated increased demand. Concerns were also raised that increased deployment of heat pumps will introduce significant seasonal variation to electricity demand, with potential implications for energy security. There was a call to work with DNOs to complete a study on the diversified load of heat pumps in close proximity.

Also in relation to meeting generation requirements, some respondents suggested that there would be value in maintaining some diversity in energy generation to ensure security of supply. This included potential for local renewable energy generation and storage, particularly in rural areas and use of Active Network Management including local trading of energy. Reference was made to the Local Electricity Bill.

Infrastructure upgrades

Respondents also supported the consultation paper in highlighting the need for infrastructure upgrades across the electricity system, to meet the increased demand associated with heat decarbonisation. This included specific suggestions for infrastructure improvement such as introduction of three phase electricity supply to domestic properties and marine interconnections for renewable energy generation.

In relation to the investment required to deliver infrastructure upgrades, a need for further evidence that network reinforcement can be delivered cost-effectively to support the ambitions for heat pump deployment was suggested. This included concerns regarding the impact of decarbonisation across other sectors, particularly transport. Studies were cited indicating the potential need for significant infrastructure investment and associated concerns that investment requirements may make some developments unfeasible. It was suggested that the Scottish Government should prioritise providing clarity on expected costs to give greater certainty to stakeholders planning for decarbonisation.

The role of the Scottish Government in facilitating investment was highlighted, including suggestions that the required investment may not be deliverable without cross-sector policy support and a significant increase in public sector funding support. It was also suggested that the Scottish Government must do more to encourage private investment – for example by ensuring it is easier and less expensive for district network operators to install upgrades, and by enabling networks to invest ahead of contracted need, to ensure that electricity networks are ready to meet increased demand.

Managing demand

Managing demand to reduce the burden on the electricity network was also an important theme for respondents. This included a focus on the role of storage in managing demand, with a call for greater Scottish Government support for energy

storage and the storage market. The relative roles of different types of storage were also referenced, including the perceived benefits for thermal storage and thermal inertia over electrical storage.

A frequently made suggestion related to potential learning from research and demonstration projects, and the potential for use of thermal stores to absorb excess electricity generation. Energy Generation and Professional Body (Energy) respondents were amongst those highlighting this issue. Respondents also referred to the differing roles of short-term electricity storage and inter-seasonal heat or chemical storage. There were calls for further policy provision (for example, within NPF4) in relation to energy storage and grid balancing, including for policy to ensure storage technologies benefit consumers and suppliers.

In relation to deployment of heat pumps and other low/zero emissions heating, a number of respondents again highlighted the importance of demand management. Specific suggestions included more action to support customers in minimising their electricity usage, including reference to ongoing trial projects focused on flexibility in demand such as use of smart technologies, greater flexibility in energy tariffs, and a perceived need for Scottish Government guidance for smart heating systems. Encouraging deployment of smart heating systems in particular was seen as having benefits in terms of managing demand, providing data to support innovation in electricity generation and delivery, and minimising the need for retrofit of systems. Potential roles of specific heat pump technologies including networked heat pumps and hybrid systems (using gas or other energy sources to meet peak demand) were suggested. There was support for further investigation of demonstration projects to assess the potential value of these and other technologies, including a number of respondents citing example projects. These included the North Isles New Energy Solutions project (NINES) and the ReFLEX Orkney project. There was also reference to Decarbonisation Fund Projects managed by Changeworks with the City of Edinburgh, Midlothian, and Fife Councils.

The role of LHEES

The role of LHEES was highlighted in relation to heat decarbonisation, for example in terms of providing a geographical roadmap for deployment of heat pumps, and identifying local need for infrastructure investment. It was also suggested that LDPs and proposals for other electricity-intensive projects can inform the identification of potential increase in demand. However, some respondents felt that LHEES pilots have demonstrated that planning authorities will require the support of gas and electricity networks to achieve heat decarbonisation in a workable and cost-effective way. This included a suggestion that sharing of intelligence between partners could help to identify potential constraints or opportunities for development of the electricity system. It was also suggested that community organisations may be in a particularly strong position to engage with customers and there was support for identification of a 'whole systems body' for each local area to coordinate electricity network development.

Improved energy efficiency

Some respondents wanted to see a prominent role for energy efficiency improvements, as part of a 'fabric first' approach to minimising electricity demand (including seasonal variation in demand). It was noted that the draft Strategy only refers to a 'fabric first' approach in relation to fuel poverty, and it was argued this should be expanded to all low/zero emissions heating interventions.

Regulatory framework

In relation to the regulatory framework for electricity distribution networks, a need for the regulatory approach to ensure a co-ordinated approach to network investment and growth in capacity was highlighted. It was suggested that the current regulatory framework does not facilitate the changes required to support the draft Strategy, and that there needs to be a change in the current regulatory basis for DNOs to balance the network, to be more proactive rather than reactive.

The intricacies of network price controls were also seen as a barrier to progress, with future price control reviews identified as opportunities to facilitate the necessary investment to support decarbonisation. A need for rebalancing of consumer energy levies and charges between electricity and gas was highlighted.

It was also suggested that the regulatory framework for electricity distribution networks needs to be flexible, in recognition of the fact that the approach and timeline for increased electricity demand is still emerging. The strategic approaches taken in relation to offshore wind investment and development of electric vehicle charging infrastructure were suggested as potential models for electricity networks.

Respondents also referred specifically to the role of Ofgem. This included suggestions that the Scottish Government should set out a new remit to ensure Ofgem supports the move to low and zero carbon energy and protects the energy costs of future consumers.

Other issues

Other issues raised in relation ensuring electricity systems are ready for heat decarbonisation included that:

- Some of the actions listed in the consultation paper are already being taken forward by network operators (for example, identifying deployment of heat pumps and working with customers to help to manage demand) and that the Scottish Government should seek to build on this where possible.
- The Scottish Government should continue to engage with DNOs, including the main energy suppliers to electric heating households and independent electricity distributors and gas transporters. This was seen as particularly important as the electricity network investment and upgrade programme continues, for example to identify any further actions required. Engagement with DNOs was seen as particularly beneficial in relation to implementation of third-party control to balance peaks in the network, and in taking responsibility for provision of storage.

- There are concerns regarding local government resourcing, and ensuring sufficient capacity across Scotland to engage with the planning of network investment.
- There should be more recognition of the whole system impact of the proposed increase in heat pumps and electricity demand. This included reference to a potential increase in need for (currently largely gas-fired) ‘peaking plants’ to maintain resilience of the electricity system.

Question 29 - What are your views on the changes set out above for the electricity networks and are there further actions that could be taken by government, the regulator or industry that would make these more cost effective? Please provide evidence to support any suggestions.

The number of respondents answering Question 29 is set out below, with 73 respondents, or 41% of all respondents, answering. Consumer Advice and Professional Body (Other) respondents were amongst those making extensive comments at this question.

Table 34

Question 29: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	3	4%
Consumer Advice, Advocacy or Campaigning	8	6	8%
Energy Generation, Supply or Distribution	20	11	15%
Housing Association	9	4	5%
Individual or Tenant Group	15	6	8%
Local Authority	23	15	21%
Product Manufacturer, Supplier or Installer	19	3	4%
Professional or Representative Body (Energy)	15	5	7%
Professional or Representative Body (Other)	21	9	12%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	4	5%
Total	178	73	100%
% of all respondents commenting		41%	

A number of those commenting at Question 29, including Consultancy and Professional Body (Energy) respondents, expressed their support for the proposed changes to electricity networks. This included support for a holistic approach to

decarbonisation, taking account of changes in the gas and transport sectors. Respondents indicated a view that the consultation document provides a comprehensive overview of the issues to be addressed, and broadly agreed with the actions set out – although as noted below, most of those providing a comment suggested some cost-saving amendment or addition.

While not disagreeing with the range of actions required, some expressed concerns regarding the ambitious timescale for proposed changes. This included reference to the volume of work required to achieve the transition proposed in the consultation document and, in particular, the work still required to improve understanding of key issues such as electricity demand and investment costs. The importance of careful sequencing of the required network investment was highlighted, as was the importance of engagement with networks and other stakeholders. However, concerns were also raised that the scale of investment required could make some developments unfeasible.

Further actions to improve cost-effectiveness

Most of those providing a comment at Question 29 suggested ways in which the proposed changes could be made more cost effective.

Demand side management was a frequently raised theme, with a suggestion that this has potential to minimise the need for infrastructure upgrades. There was also support for greater flexibility to manage the burden on electricity networks, with Consumer Advice, Energy Generation Local Authority and Product Manufacturer respondents amongst those highlighting these issues.

Reference was also made to the potential benefits of flexibility in the transition to decarbonised heat, with the role of smart controls, Active Network Management, domestic flexibility in energy use, use of constrained wind power for off-gas grid electric heating and local energy trading were all highlighted. Examples given included Scottish and Southern Electricity Network's 4D Heat project on the Isle of Skye and their work with Octopus Energy and Ohme on the home energy flexibility study, Crowdflex.

A number of respondents, including Housing Association and Local Authority respondents, highlighted the potential of a range of other technologies and approaches in minimising and managing electricity demand. This included support for the role of thermal or electrical storage including when paired with local small scale renewable generation. Some respondents referred to demonstration projects seen as having potential to deliver cost savings, or to the benefits of improving energy efficiency of domestic buildings, suggesting that improved efficiency will deliver cost benefits irrespective of the network upgrades required. The NINES project in Shetland and ReFlex Orkney were cited as good examples. A Local Authority respondent reported that they are working with electricity networks on micro grids and local energy strategies, including heat and transport and local storage to balance demand. They are also testing out localised battery storage in domestic buildings to assist capacity.

A more diverse approach to decarbonising heat was also suggested to have a role in reducing the burden on the electricity network, including a suggestion for

deployment of other heating options – such as electric boilers - in addition to heat pumps.

Respondents also highlighted potential cost benefits in securing a better understanding of future demand requirements, including taking account of cross-sector changes such as decarbonisation of transport. It was suggested that this could enable a ‘touch the network once’ approach, helping to minimise investment costs, and that providing clarity on the sequencing of investment could help to achieve cost savings. Specific evidence sources and/or technologies were highlighted as having potential to inform the understanding of future demand.

Other suggestions included that:

- Extending PDR could help to deliver lower cost energy efficiency improvements. This included support for PDR for low/zero emissions heating installations, and for replacement of buildings with poor energy efficiency with new buildings within the same footprint.
- Distribution network and system operators must be enabled to manage their network loads at a local level, without this being mediated by aggregators. This was seen by some as essential in ensuring networks are sufficiently responsive to changes in demand.
- Substantial additional funding will be required to avoid network investment costs being passed on to consumers.

Question 30 - In your view, what changes are needed to ensure that those least able to pay, including those in fuel poverty, are not unfairly impacted by the transition in our electricity and gas networks?

The number of respondents answering Question 30 is set out below, with 81 respondents, or 46% of all respondents, answering. Consumer Advice respondents were amongst those making extensive comments at this question.

Table 35

Question 30: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	2	2%
Consultancy, Training, Assessment or Accreditation	13	7	9%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	8	10%
Housing Association	9	7	9%
Individual or Tenant Group	15	7	9%
Local Authority	23	14	17%
Product Manufacturer, Supplier or Installer	19	9	11%
Professional or Representative Body (Energy)	15	8	10%
Professional or Representative Body (Other)	21	6	7%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	4	5%
Total	178	81	100%
% of all respondents commenting		46%	

A number of those commenting, amongst them Energy Generation and Professional Body (Energy) respondents, supported the Scottish Government's focus on those least able to pay and emphasised the importance of ensuring a just transition to decarbonised heat. This included a focus on protecting those experiencing or at risk of fuel poverty.

However, some felt that the Scottish Government may have under-estimated the scale of the issue. Academic, Local Authority and Public Body respondents were amongst those raising concerns. They included concern that more households may be unable to pay than suggested in the consultation document, primarily due to the high capital costs of heat pumps, and particularly in rural areas.

Respondents cited several evidence sources relating to the proportion of consumers who may be unable to meet capital investment costs.¹⁴ The proposal to further explore potential network investment costs during 2021/22 was also seen as important in shedding light on the potential scale of the issue, and it was suggested that the findings of this work should be shared with developers and networks as soon as practicable in order to inform their ongoing work.

¹⁴ These included Opinium off-grid polling conducted in April 2021 and Ecuity Consulting, Scottish Archetype Analysis (March 2021).

It was also suggested that the transition to electrical heating carries the risk that the reduced number of households using the mains gas network may have to make larger contributions to gas network maintenance.

Respondents suggested a range of approaches to ensure that those least able to pay are not unfairly impacted by the decarbonisation of heat. These are summarised below.

Reducing energy usage and costs

A frequently made suggestion, from across a range of respondent types, focused on supporting those least able to pay to improve the energy efficiency of their home. This was seen by some as an opportunity to reduce energy use (and costs) for consumers as part of a fabric first approach, and also to minimise the burden on electricity networks (and thus the need for investment). This included reference to the potential importance of the replacement for the current Warmer Homes Scotland scheme. Respondents also saw a role for use of thermal storage and 'active buildings', alongside deployment of heat pumps, including with in-built smart controls, to minimise energy use. It was also suggested that support to fuel poor households will be required to ensure they make best use of heat pumps and other technologies when they are installed.

Targeted funding and support

The need for funding and other support targeted to those least able to pay to facilitate a just transition was also a frequently made suggestion and again was raised by a range of respondent types. Some suggested that Scottish Government will need to provide substantial funding to support the transition. This included reference to the potentially large proportion of consumers who will find it difficult to meet the capital investment requirements for deployment of low/zero emissions heating. Respondents typically referred to direct grants, but other financial incentives were also suggested such as subsidised energy costs and Council tax discounts. It was also suggested that existing funding mechanisms could be better targeted, including through the use of Area Based Schemes. In addition to Scottish Government funding, some also saw a need for DNOs to provide 'gap funding' to overcome barriers to capital investment costs for some households. It was also suggested that DNOs and other organisations will require support to engage with customers – for example providing advice and support around energy use and tariffs.

Wider reform of energy markets

Respondents also suggested potential wider reform of energy markets that could help those least able to pay. This most commonly related to the disparity in current levies on gas and electric energy costs; it was suggested that levies should be redistributed between electricity and gas (reflecting their relative carbon emissions) and/or moved to general taxation. Local Authority, Product manufacturer and Professional Body (Energy) respondents were amongst those raising this issue. There was support for Scottish Government continuing to work with the UK Government to achieve this although some noted risks associated with this approach (for example for gas-fired heat networks, and for lower income households who use a higher ratio of gas to electricity).

Respondents also referred to a range of other potential energy market reforms that could help those in or at risk of fuel poverty. These included:

- Development of specific tariffs to encourage the transition to low/zero emissions heating, and to protect fuel poor households from being impacted negatively.
- Caps on supply costs, ensuring those with limited energy supply options are not disadvantaged.
- Flexibility markets and smart local energy systems, including potential for communities to generate income through grid services.
- Regional electricity pricing, for example taking account of the majority of renewable energy being generated in rural areas.
- Limiting network connection and upgrade costs.
- Integrating consideration of energy use and costs from the initial design stage for new developments, including a role for energy networks. This included reference to a number of example projects.
- Engaging communities in decision making around energy markets and costs.

Alternative fuels and technologies

Respondents also highlighted a range of alternative fuels and technologies as having potential to reduce energy costs, for all consumers but particularly those least able to pay. This included reference to low-cost hydrogen boilers with some comparing the potential cost of hydrogen with electric heat pumps and suggesting that provision of new hydrogen appliances could be funded through the network price control framework. Some saw a need for a mixed approach to decarbonising heat which makes use of a range of energy sources – particularly in rural off-grid areas. Respondents also saw an important role for demonstration projects in determining how these and other technologies can play a role ensuring a just transition.

Other suggestions

It was also suggested that targeting and phasing of network investment could be shaped to support those in or at risk of fuel poverty, for example with an initial focus on the energy and heating types with the highest prevalence of fuel poverty.

Gas networks

The consultation paper notes that around 81% of homes and 30% of non-domestic buildings in Scotland use mains gas (natural gas) for heating and states that, to meet emissions targets, use of natural gas will need to be reduced significantly and eventually phased out. Alongside implementing energy efficiency measures, there are two main ways to achieving this reduction: replacing the natural gas provided in the network with decarbonised alternatives and switching to alternative heating systems in buildings, such as heat pumps and heat networks.

The Scottish Government intends to: build on work to provide evidence on the role gas decarbonisation can play in meeting targets, and a timeline for resolving

uncertainties; undertake analysis to identify strategic areas most and least likely to have access to low carbon or green hydrogen in the future; work with the UK Government on the terms for the Green Gas Support Scheme; and work with the Gas Network Operators and the UK Government to explore opportunities for increasing the blend of low carbon or green hydrogen in the gas network.

Question 31 - What are your views on the changes set out above for the gas networks?

The number of respondents answering Question 31 is set out below, with 82 respondents, or 46% of all respondents, answering. Public Body respondents were amongst those making extensive comments at the question.

Table 36

Question 31: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	4	5%
Consultancy, Training, Assessment or Accreditation	13	5	6%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	13	16%
Housing Association	9	6	7%
Individual or Tenant Group	15	5	6%
Local Authority	23	14	17%
Product Manufacturer, Supplier or Installer	19	8	10%
Professional or Representative Body (Energy)	15	7	9%
Professional or Representative Body (Other)	21	6	7%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	3	4%
Total	178	82	100%
% of all respondents commenting		46%	

Some of those providing comments expressed their overall support for the proposed changes for gas networks. This included specific reference to the importance of Scottish Government taking a ‘whole system’ approach to heat decarbonisation, which considers changes to electricity and gas networks in tandem.

Provide evidence on the role of gas decarbonisation

There was support for the Scottish Government working with stakeholders to provide evidence on the role of gas decarbonisation, and set out a timescale to

resolve outstanding questions. However, some respondents expressed concern that this may introduce further uncertainty around policy support for gas decarbonisation, delaying investment decisions.

The most frequently raised theme was support for the recognition that decarbonised gas is unlikely to play a significant role in emissions reduction before 2030. Energy Generation and Product Manufacturer respondents were amongst those noting their support. However, some were sceptical about the potential longer-term role of hydrogen and other low carbon gases, beyond use in specific locations. Some respondents suggested that deployment of heat pumps and other low/zero emissions technologies should not be delayed or curtailed for the sake of the future potential of decarbonised gas – particularly where these would be low or no regret options – and there was a call for development of LHEES to assume that the gas grid will be decommissioned.

Other comments in relation to this action included:

- While hydrogen and other renewable gas options are still emerging technologies, a range of specific options have potential to contribute to the decarbonisation of heat. This included hydrogen boilers and hydrogen fuel cells.
- Support for increasing the blend of hydrogen and bio-methane across the gas network as a means of reducing emissions in the shorter-term. However, specific concerns were raised regarding potential use of biomethane as a long-term solution, referring to its reliance on food production and potential landscape impact.
- Suggestion that consideration of the role of the gas network in decarbonisation of heat should include potential for the gas network to move industrial volumes of energy long distances and that, even if the network is no longer required to meet direct heat demand, it could be used to transport hydrogen as a means of moving energy from generation sites to district heat pumps.

Identifying strategic areas likely to have access to low carbon or green hydrogen in the future

In relation to identifying strategic geographic areas for low carbon or green hydrogen, views were mixed on the contribution that hydrogen can make to decarbonisation of heat (as noted above). This was also reflected in views on proposed analysis to identify strategic areas where hydrogen may be a viable option. Although there was support for this action as an opportunity to make best use of hydrogen there was also concern that the focus on specific strategic areas would fail to consider the role of decarbonised gas across Scotland as a whole – including in supporting the electricity grid to meet demand.

In terms of taking forward planning for specific strategic areas, there was support for a 'whole systems body' to consider constraints and opportunities in these areas, and to bring together the full range of stakeholders. It was also suggested that any deployment of hydrogen boilers should take time to determine the likelihood of gas

mains in specific locations being converted to hydrogen – to avoid ‘gas lock in’ for customers.

Green Gas Support Scheme

Some respondents expressed support for the principle of a green gas levy on suppliers, but reiterated concerns set out in the consultation document regarding potential impact on consumers. It was suggested that restrictions should be placed on suppliers to ensure a levy does not impact those least able to pay.

More significant concerns were also expressed, with the Green Gas Levy as currently designed seen as a regressive measure. The potential impact on low income households was highlighted, noting that even where households seek to limit their energy use to keep bills down, they will be required to pay the same fixed charge as higher income households, and there was a call for any levy to be linked to volume of gas used.

There was support for proposals to explore opportunities for increasing the blend of low carbon or green hydrogen in the gas network, although views were mixed on how significant this role is likely to be. As noted above, some agreed that hydrogen is unlikely to play a significant role before 2030, including some who were sceptical about whether hydrogen will ever be a feasible option for large scale decarbonisation of heat. A risk to Scotland’s deployment of hydrogen if leading hydrogen sites are in England and Wales was also suggested. However, it was also argued that hydrogen (and other decarbonised gases) can play a significant role, particularly in specific areas, and there was some concern that favouring other low/zero emissions technologies could reduce the investment case for hydrogen. This was a more frequently made point and was most likely to have been raised Energy Generation or Local Authority respondents. Reference was made to ongoing and potential projects considering the future role of hydrogen. They included the H100 Fife project and SSEN Transmission’s research with Element Energy to identify how hydrogen could be developed in the north of Scotland.

A need for clearer policy support for low carbon and renewable gas was suggested, including reference to the differential in levies on renewable gas in comparison to renewable electricity. The Green Gas Support Scheme was also identified as providing an opportunity to secure cost-effective investment, for example in blending decarbonised gases with natural gas. It was suggested that the Scottish Government’s approach to hydrogen should be ‘technology neutral’, for example including bio-hydrogen in addition to low carbon or green hydrogen.

Question 32 - Are there further actions that could be taken by government or industry that you think would make the changes set out more cost effective? Please provide evidence to support any suggestions.

The number of respondents answering Question 32 is set out below, with 46 respondents, or 26% of all respondents, answering.

Table 37

Question 32: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	2	4%
Consultancy, Training, Assessment or Accreditation	13	2	4%
Consumer Advice, Advocacy or Campaigning	8	4	9%
Energy Generation, Supply or Distribution	20	8	17%
Housing Association	9	2	4%
Individual or Tenant Group	15	3	7%
Local Authority	23	10	22%
Product Manufacturer, Supplier or Installer	19	4	9%
Professional or Representative Body (Energy)	15	6	13%
Professional or Representative Body (Other)	21	2	4%
Public Body	7	2	4%
Third Sector or Non-Governmental Organisation	14	1	2%
Total	178	46	100%
% of all respondents commenting		26%	

A number of respondents, including Consultancy, Energy Generation and Local Authority respondents, suggested areas where they felt that further action could help to achieve cost savings. This included a number who wished to see the Scottish Government working to make best use of available evidence, including open data, to inform the transition to decarbonised heat. Respondents referred to the potential benefits of information sharing between a range of stakeholders including energy providers, heat pump providers, engineers and installers. Information sharing was highlighted as particularly valuable in terms of tracking increases in energy demand as the transition progresses.

A number of respondents saw an opportunity for Scottish Government to work with stakeholders to secure short-term gains in carbon reduction. This included specific reference to:

- A fabric first approach, including a focus on energy efficiency improvements, and a suggestion that in terms of EPC ratings it would be better simply to aim for EPC band A rather than setting interim targets.
- An initial focus on locations where the greatest impact can be achieved in terms of carbon reduction, including higher density urban areas and areas with existing energy from waste (EfW) plants.

Respondents suggested a number of additional actions to make decarbonising the gas network more cost effective. These included:

- The Scottish Government providing a clear commitment to decarbonising the gas network, including targets for increasing the share of decarbonised gas. There were calls for policy support for a range of low carbon gases including syngas¹⁵ and hydrogen, including reference to the disparity in pricing of renewable gas and electricity.
- Encouraging adoption of a revised billing methodology to enable injection of biomethane and other low carbon gases into the grid, without undue costs.

Additional actions were also suggested specifically in relation to the future role of hydrogen namely that:

- The proposed analysis of strategic locations for hydrogen should be brought forward ahead of publication of the final Heat in Buildings Strategy, to ensure a co-ordinated approach to roll-out of heat pumps and hydrogen.
- On-site gas network and appliances should be assessed to ensure readiness for hydrogen.
- Hydrogen-ready boilers should be mandated to help reduce potential retrofit costs.

A range of other technologies and approaches were also recommended as contributing to cost savings in the transition to decarbonised heat including:

- Potential for time of use tariffs to support a cost-effective transition, and better understanding of time of use markets and the potential impact on energy demand.
- The role of heat networks in both urban and more rural areas, with a suggestion that the Scottish Government should ensure greater flexibility in support mechanisms for heat networks, particularly those with more than one stakeholder.
- Implementation of Digital Twin technologies to inform analysis of energy requirements.
- More joint working between the low/zero emissions heat sectors and the construction industry, to increase industry awareness and understanding of best practice.

Creating the conditions to secure growth of Heat Networks in Scotland

The consultation paper describes heat networks as a tried and tested technology that, while used extensively across Europe, currently supply only 1.5% of heat in Scotland. They are seen as a key strategic technology for reducing emissions from homes and buildings and can change their fuel source over time. The consultation paper sets out a range of actions the Scottish Government intends to take to support their growth.

¹⁵ Syngas - an abbreviation for synthesis gas - is a mixture of carbon monoxide, carbon dioxide, and hydrogen.

Question 33 - What evidence can you provide on the potential for heat networks in Scotland that can help inform a new ambition for deployment within the final Heat in Buildings Strategy?

The number of respondents answering Question 33 is set out below, with 71 respondents, or 40% of all respondents, answering. Energy Generation and Professional Body (Energy) respondents were amongst those making extensive comments at this question.

Table 38

Question 33: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	3	4%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	6	8%
Consumer Advice, Advocacy or Campaigning	8	4	6%
Energy Generation, Supply or Distribution	20	9	13%
Housing Association	9	4	6%
Individual or Tenant Group	15	7	10%
Local Authority	23	11	15%
Product Manufacturer, Supplier or Installer	19	5	7%
Professional or Representative Body (Energy)	15	7	10%
Professional or Representative Body (Other)	21	4	6%
Public Body	7	4	6%
Third Sector or Non-Governmental Organisation	14	4	6%
Total	178	71	100%
% of all respondents commenting		40%	

Some respondents, including Energy Generation and Professional Body (Other) respondents, expressed broad support for the role of heat networks in the transition to decarbonised heat, and in particular for the Heat Networks (Scotland) Act 2021 in setting clear targets for deployment and giving a clear indication of long-term policy support for heat networks. This included support for the volume of thermal energy to be produced by heat networks, and also the commitment to net zero carbon heat networks.

Types and scale

Respondents also referred to the relative merits of various types of heat network. This included comments from several organisations involved in design and delivery of heat networks who suggested that their experience has proven that heat networks can meet heat demand in an energy efficient way. Specific reference was

made to Shared Ground Arrays, 5th generation heat networks with low temperature circulation loops, and 'cluster density' heat networks. Respondents also referred to the relative benefits of various heat network fuel sources such as river, sea or loch water, bioenergy, and hydrogen CHP. There was a suggestion that this range of fuel sources can help to adapt heat networks across a range of higher and lower population density areas.

There was support for the proposed approach to investment to maximise the role of heat networks and reference to projections from the Committee on Climate Change on the potential scale of supply that heat networks could generate. Circumstances where heat networks are likely to be most effective were noted, for example in urban areas with high heat demand, although it was also suggested that the technology can be adapted to suit higher and low population density areas across Scotland, including off-gas grid areas.

Potential barriers

Some respondents referred to potential barriers to heat network deployment such as:

- A need to align the various policy mechanisms supporting deployment of heat networks.
- Potential challenges in decarbonising the fuel source for heat networks, including reference to limited options for heat networks currently fuelled by natural gas.
- Challenges with minimising loss of energy through pipework.
- A need to ensure the financial viability of networks and to reduce investment risk, particularly in the context of relatively high capital costs.
- A need to ensure adequate protections for consumers on the reliability of heat network supply.
- Specific challenges in developing large scale heat networks where multiple organisations may be required.
- Access to anchor buildings for larger-scale networks.
- Ongoing management and maintenance of heat networks, particularly in areas with limited availability of qualified contractors.
- Identification of suitable bodies to manage smaller heat networks.
- Managing environmental impact.
- A potential time lag between development completion and connection to a heat network.
- Restrictions on NHS sites acting as anchor loads for heat networks.

It was argued that the Strategy should give closer consideration to such issues, including a perceived need for the Scottish Government to consider how it may help to de-risk development of heat networks.

Concerns were also raised regarding the proposal to require new developments to connect to an existing heat network if they are within a heat network zone. It was

suggested that developers should be allowed the flexibility to decide on the best low/zero emissions heat solution for each development and that the need for a mandate suggests that existing heat networks may not be the best solution. It was also suggested that, dependent on the development, alternatives may be better options in terms of energy efficiency, carbon emissions and running costs, and that existing heat networks should be assessed for energy efficiency and carbon emissions (including whether there is a clear plan to decarbonise).

There was also a reference to specific evidence on the likely scale of deployment that may be possible, and it was noted that data on the current heat network market is more limited as heat networks are unregulated.

Examples of existing and planned heat networks

Some respondents referred to existing and planned heat networks as potential exemplars of the supply that can be generated by heat networks. This included a diverse range of heat networks in terms of scale, specific technologies and energy sources used. These examples also varied in terms of the extent to which respondents felt they could be replicated elsewhere, but all were offered as providing learning points which could inform ongoing deployment of heat networks. They included:

- Projects that have been funded via the District Heating Loan Fund.
- Scottish Gas Network's 5 Strategic Independent Undertakings (SIUs) at Wick, Thurso, Oban, Campbeltown and Stornoway. The first four of these SIUs run off LNG, whilst Stornoway uses LPG.
- Aberdeen Heat & Power, which was established 18 years ago and has successfully demonstrated heat network growth and increased customer numbers.
- Shetland Heat and Power which uses hot water created from unrecyclable waste to heat approximately 1230 domestic properties and commercial and public buildings around Lerwick including schools, care homes, the leisure centre and the local Hospital.
- The Core 364 project in Sunderland in which heat pumps on a shared ground-loop were paired with heat batteries to enable the cost-effective removal of gas combi-boilers from 364 apartments.
- The Queen's Quay project in Clydebank, which uses water source heat pumps to extract water from the River Clyde to heat nearby homes and buildings.
- The Iona Heat Network, as an exemplar on how to decarbonise heat and address energy efficiency in the most challenging and remote contexts.
- The Ground Source Heat Pump installed at Hallam House, Beeswing, Dumfries.
- The biomass and thermal borehole at Hill of Banchory, as a model for how these technologies can be applied in multiple locations across Aberdeenshire.
- Linlith-Go-Solar, a community energy enterprise in Linlithgow which aims to make solar work for the benefit of the whole town.

A small number of respondents cited specific research reports or evidence on the potential for heat networks in Scotland including:

- Heat Networks in Scotland's Cities, Scottish Renewables research. This research was reported to suggest that heat networks could deliver at least 8% of Scotland's heat demand by 2030.
- Green Heat in Greenspaces report for Greenspace Scotland. Respondents reported that this identified 32% of settlements in Scotland (accounting for 90% of all settlement heat demand) as being potentially well suited to heat networks, and 23% of all larger greenspaces as having access to a potential heat anchor building. The research also considered the potential scale of water source heat, and large scale ground arrays.
- 'Meeting the Strategic Challenges of UK district heating' from Heat & the City programme.
- The District Heating Loan Fund as a source of data on the fuel sources of established district heat networks.

Question 34 - What evidence can you provide on the potential for heat derived from energy from waste to qualify as low or zero emissions?

The number of respondents answering Question 34 is set out below, with 47 respondents, or 26% of all respondents, answering. Third Sector respondents were amongst those making extensive comments at this question.

Table 39

Question 34: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	4%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	2	4%
Consumer Advice, Advocacy or Campaigning	8	4	9%
Energy Generation, Supply or Distribution	20	5	11%
Housing Association	9	1	2%
Individual or Tenant Group	15	6	13%
Local Authority	23	9	19%
Product Manufacturer, Supplier or Installer	19	3	6%
Professional or Representative Body (Energy)	15	6	13%
Professional or Representative Body (Other)	21	3	6%
Public Body	7	2	4%
Third Sector or Non-Governmental Organisation	14	3	6%
Total	178	47	100%
% of all respondents commenting		26%	

A number of respondents, including some Professional Body (Energy) respondents, expressed support for use of EfW to facilitate deployment of heat networks, suggesting there is a significant opportunity for waste-based feedstocks to qualify as low carbon. It was suggested that this potential would otherwise be lost as there is limited economic value in wastes that may have high freight costs and low product value. A respondent who preferred to avoid burning waste noted that where waste is to be burnt then it would be beneficial to make use of the energy generated for heat.

It was argued that using waste for production of heat should be viewed as a positive outcome, and should be considered low carbon. The benefits of EfW in terms of carbon and methane emissions when compared with landfill were cited in support of this view, and a suggestion that EfW should be considered low carbon if the percentage recovery of embodied energy in the waste feedstock is taken into consideration, together with reduced need for transportation and landfill disposal of waste. Respondents also highlighted:

- Evidence that conversion to CHP could enable some EfW plants to achieve the low carbon standard.
- The potential for use of CCS to enable EfW to meet the standard for low carbon.

- Evidence on the composition of waste, including that the proportion of biogenic material means EfW could be considered a form of bioenergy.
- The potential for waste feedstocks to be used to produce bioLPG, which would be classified as low fossil fuel.

However, other respondents raised concerns around use of waste to generate energy. This was described as a ‘high-carbon activity’ which could hamper work to decarbonise heat, with suggestions that the Committee on Climate Change and Zero Waste Scotland have both failed to find EfW to be a low/zero emissions heat technology. There were also broad concerns that, while preferable to landfill, EfW should only be considered after reducing, re-using, recycling and composting have been maximised. In these circumstances, it was suggested, EfW could be considered low or zero carbon. Concerns were raised, however, around the extent to which this is realised in practice, suggesting that a proportion of waste used in EfW sites may be fossil-fuel based, or could have been recycled. It was suggested that, in terms of overall environmental impact, EfW is little better than landfill. In light of these concerns, there was a perceived need for more robust assessment of whether heat is a viable final product for waste, and a full life-cycle analysis of the waste fuel chain.

Concerns were also raised around the long-term viability of fuel streams for some EfW technologies. This included concerns around EfW’s reliance on a linear system of waste production that is not consistent with, and indeed could frustrate, the move to a circular economy. Similarly, it was suggested that increased demand for waste to support growth in EfW could frustrate progress in waste reduction. It was also suggested that EfW plants typically require a secondary heat source to allow for necessary downtime and maintenance and that such secondary sources should use renewable energy. In this context, it was reported that the Shetland EfW scheme is looking to secure a renewable fuel source to replace the oil currently used at times of maintenance and during winter peak periods.

Regulation of EfW

Reflecting the consultation paper, it was observed that the UK has fallen behind a number of European countries in use of EfW. Respondents suggested a number of potential factors underlying this including: a lack of incentives to develop CHP; the low cost of gas and heat compared to electricity; and challenges posed by the distance between EfW generation and residential heat demand. Lack of government support to overcome these was suggested. Potential for high heating costs if operating efficiencies and distribution heat losses do not meet expectations were also highlighted.

Some respondents saw a need for additional incentives and regulation, or greater flexibility in existing regulation, to support further development of EfW and facilitate deployment of emerging EfW technologies. This included reference to experience of Shetland Heat and Power, and a suggestion that regulations in effect prevented the addition of wind energy to grow the scheme. It was also suggested that the approach to EfW being taken by Zero Waste Scotland appears to be inconsistent with the aims of the draft Strategy. However, a ‘market failure’ was also cited, whereby the carbon emissions and environmental harm associated with EfW are

not reflected in the cost of incineration. It was suggested that any further financial incentives for development of EfW, without regulation to reflect environmental impact in incineration costs, would compound this 'failure'.

Experience to date

Respondents referred to a number of specific examples of EfW projects that may help to inform the Scottish Government's approach. These included examples cited in the draft Strategy, namely those on Shetland and at Millerhill in Midlothian. In addition, reference was made to: Borders College use of heat via wastewater heat recovery; Aberdeen City Council and partners developing an EfW plant and heat network in Aberdeen; and the Glasgow Recycling and Renewable Energy Centre, which incorporates generation of renewable energy from waste that would otherwise have gone to landfill, and could be adapted to support heat networks through EfW or waste heat.

In terms of the experience of EfW schemes to date, respondents highlighted:

- Experience in Shetland indicating an issue of reduced calorific value due to the removal of recyclables from the waste stream.
- Green Space Scotland research identifying nine EfW plants in Scotland that are within settlement boundaries, and which offer potential to supply heat networks.

Technologies

With respect to developing technologies, there was reported to be increasing interest in Advanced Conversion Technologies in production of renewable transport fuels, heat and power. It was suggested that the smaller scale of these facilities (as compared to EfW sites) could better suit smaller heat networks or could increase scope for use of smaller scale waste streams.

Potential for Hydrothermal Carbonisation of waste as a means of producing low carbon fuel for heat was highlighted. It was noted that the UK's first pilot plant is currently trialling use of a variety of waste feedstocks to produce a clean-burning, low carbon fuel that was suggested to have potential to be used in heat networks.

The extent to which heat networks can use heat from a wide variety of energy sources was also discussed. There was support for use of industrial waste heat to support heat network development, with some respondents suggesting that this can offer efficiency benefits, and potentially support a wider range of low/zero emissions heat technologies. Respondents referred to examples of the use of waste heat - they included Scottish Water's Horizons heat from waste water plant/technologies in Edinburgh and Stirling and the Glasgow Recycling and Renewable Energy Centre operated by Glasgow City Council in partnership with Viridor.

It was noted that the development of heat networks with lower temperature distribution pipework provides further opportunity to use waste heat. In this context, there was reference to the European Commission funded Supporting new Opportunities for Waste Heat And cold valorisation Towards EU decarbonization project (SO WHAT); this a software demonstrator project that seeks to provide software to assess the relative benefits and costs of waste heat technologies.

Question 35 - What views do you have on mechanisms to support this and the use of wider sources of waste heat?

The number of respondents answering Question 35 is set out below, with 51 respondents, or 29% of all respondents, answering. Consumer Advice and Third Sector respondents were amongst those making extensive comments at this question.

Table 40

Question 35: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8		0%
Community Council, Trust or Group	6	2	4%
Consultancy, Training, Assessment or Accreditation	13	4	8%
Consumer Advice, Advocacy or Campaigning	8	5	10%
Energy Generation, Supply or Distribution	20	7	14%
Housing Association	9	1	2%
Individual or Tenant Group	15	7	14%
Local Authority	23	9	18%
Product Manufacturer, Supplier or Installer	19	2	4%
Professional or Representative Body (Energy)	15	5	10%
Professional or Representative Body (Other)	21	4	8%
Public Body	7	2	4%
Third Sector or Non-Governmental Organisation	14	3	6%
Total	178	51	100%
% of all respondents commenting		29%	

Some respondents, including Energy Generation and Professional Body (Energy) respondents, saw a clear need for new mechanisms to support wider use of EfW and waste heat, suggesting that uncertainty around policy support for waste heat has been a significant barrier to investment in the technologies. This reflected a view that the economics of EfW and waste heat technologies are likely to be challenging without public sector support, and that existing support mechanisms are inadequate. It was also suggested that challenges around development of heat networks are a key barrier to development of EfW and waste heat technologies, with some respondents citing support for heat networks as a key element in enabling greater use of EfW and waste heat.

There were calls for a more co-ordinated and comprehensive policy approach to EfW and waste heat. This included support for an area-based approach to decarbonisation of heat and deployment of EfW and waste heat, with calls for

closer alignment between funding streams and LDP/LHEES zoning. It was noted that the viability of waste heat recovery is likely to vary significantly across Scotland and some respondents saw a need for detailed assessment to identify potentially viable sources of waste heat, and to direct support accordingly.

Concerns were also raised around government support for EfW, including reference to the technology as a high carbon activity. Although it was suggested that EfW could be used on an interim basis, to support development of heat networks until more circular energy sources are identified, there were also calls for a focus on use of energy sources with a wider set of environmental and health benefits (including waste heat) and/or higher rates of recycling. The potential for support mechanisms to distort the market for other technologies was also suggested and it was argued these incentives should be used with care.

Some concerns were also raised around support for waste heat. This included suggestions that a commitment to long-term supply of waste heat remains challenging for many industrial sites, and that support for use of waste heat in heat networks should be carefully calibrated to ensure that this does not undermine the incentive for businesses to minimise waste heat.

Suggestions of additional support for EfW and waste heat included use of existing funding mechanisms such as the Low Carbon Infrastructure Transition Programme (LCITP) and the Green Heat Network Fund. Other financial mechanisms were also proposed, including loan guarantees for new heat recovery projects, and development of new public funding mechanisms, with potential models such as the Industrial Heat Recovery Support programme and Renewable Heat Initiative (RHI) suggested.

Potential for use of the tax system to support EfW and waste heat was also highlighted including:

- Penalties on generators of waste heat that is not used by a heat network.
- Ensuring the Business Rates regime does not apply additional levies to assets associated with waste heat recovery.
- Tax breaks for businesses purchasing heat recovery technologies (with reference to the Enhanced Capital Allowance model) and tax relief for heat networks using waste heat (or other low carbon energy sources).

Other regulatory mechanisms suggested to support deployment of EfW and waste heat included:

- Placing a requirement on developers of EfW facilities to find a use for the heat produced (noted as the current approach in Norway). A similar requirement for generators of waste heat to establish a connection with heat networks where feasible.
- Designation of waste heat as low/zero carbon for the purposes of planning criteria or mechanisms to expedite the planning process for heat recovery projects.
- Legislation to provide surety of a consumer base for waste heat.

Respondents also referred to waste heat recovery from industrial sources as a potential priority for policy and funding support. There was support for specific technologies which could support deployment of EfW or waste heat, such as integrating thermal accumulator storage and lower temperature heat networks enabling use of a wider range of waste heat sources.

Carbon pricing reform was also suggested as significant in terms of enabling use of waste heat or low carbon forms of heat, for example where heat pump technology is required to step up the heat produced.

Question 36 - With the sustainable market for heat networks described above in place by the early-2020s, are there any further gaps that must be filled to support subsequent delivery of heat networks? If so, what are these and are there particular types of organisation that would be key in filling these?

Responses at Question 36 by respondent type are set out below.

Table 41

Question 36 - With the sustainable market for heat networks described above in place by the early-2020s, are there any further gaps that must be filled to support subsequent delivery of heat networks?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	1	0	1
Community Council, Trust or Group	1	0	1
Consultancy, Training, Assessment or Accreditation	6	0	6
Consumer Advice, Advocacy or Campaigning	3	1	4
Energy Generation, Supply or Distribution	7	1	8
Housing Association	2	0	2
Individual or Tenant Group	3	1	4
Local Authority	9	1	10
Product Manufacturer, Supplier or Installer	7	1	8
Professional or Representative Bodies (Energy)	6	0	6
Professional or Representative Bodies (Other)	3	1	4
Public Body	4	0	4
Third Sector or Non-Governmental Organisation	5	0	5
Total	57	6	63
Total %	90%	10%	

Of those respondents who answered the question, a clear majority – 90% – thought there are further gaps that must be filled to support delivery of heat networks, while 10% thought that there are not.

The number of respondents making a further comment at Question 36 is set out below, with 67 respondents, or 38% of all respondents, commenting. Consumer Advice and Energy Generation respondents were amongst those making extensive comments at this question.

Table 42

Question 36: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	6	9%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	9	13%
Housing Association	9	2	3%
Individual or Tenant Group	15	5	7%
Local Authority	23	12	18%
Product Manufacturer, Supplier or Installer	19	6	9%
Professional or Representative Body (Energy)	15	6	9%
Professional or Representative Body (Other)	21	4	6%
Public Body	7	4	6%
Third Sector or Non-Governmental Organisation	14	5	7%
Total	178	67	100%
% of all respondents commenting		38%	

There was support for the proposed market for heat networks, with further comments suggesting that this provides the clear and consistent policy framework required to support delivery of heat networks. However, most of those providing a comment identified one or more potential gaps in the proposed market framework. This included a view that the most significant gap remains the commercial viability of heat networks, and whether heat can be supplied to consumers without an increase in fuel poverty. It was also noted that heat network consumers do not have the opportunity to change energy supplier, and that the only price regulation for heat networks is through the contract under which the heat supplier is appointed.

Respondents discussed a number of areas or specific actions as being required to support development of heat networks. Some referred to wider policy areas, such as the shift away from fossil fuels, air quality and consumer protections. However, others identified specific aspects of the market framework which were perceived as gaps, or areas where some wished to see the Scottish Government go further.

Regulate for offtake surety

This was the most frequently raised issue, with Consultancy, Energy Generation, Professional Body (Energy) and Third Sector respondents amongst those highlighting it.

In terms of providing offtake surety, an obligation for anchor load buildings within heat network zones to connect to a network where feasible was suggested. Reference was also made to the role of public procurement in supporting heat networks and a requirement for all public buildings close to or within heat network zones to connect where feasible. Regulations to enable NHS estates assets to be used as anchor loads was also suggested. Encouragement for privately-owned non-domestic buildings within heat network zones to connect to a network was also proposed, with some respondents calling for secondary legislation in this area.

Support decarbonisation

More support for existing heat networks to facilitate their decarbonisation was suggested, including additional financial support to avoid decarbonisation costs being passed on to consumers. It was also suggested that transitional arrangements should protect existing heat networks designed to expand over time, such that they are not prevented from doing so before proposed decarbonisation thresholds are met.

Improve public awareness and consumer protection

The need to build public awareness of and confidence in heat networks, and of low/zero emissions heat technologies more widely, was a frequently made suggestion. Consumer Advice and Local Authority respondents were amongst those highlighting this issue.

The importance of ensuring appropriate consumer protection was also highlighted, including with respect to access to information and advice on heating costs. Other elements suggested to be important included:

- Quality of service obligations.
- Complaints procedures.
- Licencing of heat network operators.
- Security of heat supply
- Support to ensure efficient use of heat networks by consumers.

The need for greater transparency around the performance of heat networks including operating efficiencies was suggested and it was suggested that CP1 2020¹⁶ should be used as a minimum quality standard.

Implement robust price regulation

It was suggested that price regulation should take account of the terms on which a heat network is extended, the capital cost of extension, how connection and reinforcement costs are allocated, and the prices charged to consumers. There was also support for energy service companies operating on a not-for-profit basis, for example through social enterprises.

Support the role of local authorities

¹⁶ CP1: Heat networks: Code of Practice for the UK (2020) available at <https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q3Y00000IMrmGQAT>

Ensuring deployment of heat networks is guided by local authorities and LHEES, was suggested, as was the need for additional support for local authorities in development of LHEES. Some respondents wished to see local authorities take on development of heat networks, ensuring they have access to the support and expertise required for their scoping and procurement.

Address the skills gap

A need for more support to fill skills gaps across Scotland, including the design, commissioning, installation and maintenance of heat networks was highlighted. Support to identify skills gaps, and for the training programmes necessary to fill these were suggested, with concerns raised with respect to rural and island areas.

Improve the evidence base

Improving the evidence base to inform development of heat networks was suggested, for example establishing a national dataset of high heat density zones that are potentially suitable for heat networks and identifying all publicly owned buildings (and particularly those with high heat demand) that could act as heat network anchors.

Engage with stakeholders

In addition to comments around the importance of Scottish Government continuing to engage with industry and other stakeholders, several specific organisations were cited as having a role in helping to fill gaps in the market framework:

- The Heat Trust, described as the 'gold standard' for heat networks, was cited as a valuable source of expertise around development of the heat network industry.
- Public bodies with experience of developing heat networks, including specific reference to Scottish Water.
- Skills Development Scotland and Energy Skills Partnership in ensuring access to the training required to address any skills gaps.

Other support

Other issues raised in relation to providing support for heat networks included:

- A call for guidance on the potential role of specific technologies, including low-temperature heat networks and 'virtual heat networks' of remotely charged and controlled storage heaters.
- Clarification of how the Scottish regulatory regime for heat networks will link with implementation of the Heat Networks Market Framework being developed by the UK Government.
- Disincentivising use of fossil fuel heat sources, alongside support for investment in low/zero emissions heat networks. In this context, there were calls for the Scottish Government to confirm an end date for gas boiler retrofit.

Chapter 6: Kick-starting the Investment in the Transition

Transforming Scotland's homes and buildings is a significant investment opportunity that will support supply chains, jobs and economic growth. The Scottish Government will kick-start this transition with almost £1.6 billion of capital funding during the next five years. In addition to a range of actions designed to support investment, the consultation paper sets out four strategic priorities that have been identified: supporting those least able to pay; investing in strategic technologies in low or no regrets areas; showcasing net zero leadership and sharing learning through early adoption in key areas of focus; and investing in innovation and demonstration to drive forward competitive advantage.

Question 37 - What are your views on the range of actions identified above to kick start the investment in the transition over the next 5 years?

The number of respondents answering Question 37 is set out below, with 97 respondents, or 54% of all respondents, answering. Housing Association and Third Sector respondents were amongst those making extensive comments at this question.

Table 43

Question 37: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	3	3%
Community Council, Trust or Group	6	3	3%
Consultancy, Training, Assessment or Accreditation	13	8	8%
Consumer Advice, Advocacy or Campaigning	8	5	5%
Energy Generation, Supply or Distribution	20	11	11%
Housing Association	9	7	7%
Individual or Tenant Group	15	6	6%
Local Authority	23	19	20%
Product Manufacturer, Supplier or Installer	19	10	10%
Professional or Representative Body (Energy)	15	6	6%
Professional or Representative Body (Other)	21	9	9%
Public Body	7	6	6%
Third Sector or Non-Governmental Organisation	14	4	4%
Total	178	97	100%
% of all respondents commenting		54%	

Many respondents, from across a broad range of respondent types, expressed overall support for the range of proposed actions. This included reference to supporting the most vulnerable households (particularly those in fuel poverty), and the least energy efficient/highest emitting homes.

There was also support for the initial focus on low regret actions and the public sector acting as leaders in heat decarbonisation. Some referred to the coming years as an opportunity to generate momentum in the take-up of decarbonisation measures, to allow the supply chain to grow and to build consumer confidence. Energy efficiency improvements, support for the most vulnerable and other low regret options were seen as the right focus during this period to prepare the ground for wider take-up.

Overall, respondents described the consultation document as setting out a wide ranging set of actions, and there was specific support for the £1.6 billion investment over the next five years. However, some noted that the Scottish Government has estimated the total investment cost of transition for all buildings in Scotland at more than £30 billion and it was suggested that forthcoming retrofit standard (PAS 2035) is likely to increase costs. These respondents raised concerns that public funds and existing mechanisms will not be sufficient to achieve the required scale of transition and called for further detail on how the decarbonisation of heat is to be funded. This included more detail on how the £1.6 billion is to be apportioned, how much UK Government schemes could be expected to add to this figure, and how private finance will be leveraged.

Some respondents raised concerns around how the proposed set of actions will translate into the required scale of heat decarbonisation over the medium to longer term. They included Local Authority, Professional Body (Other) and Third Sector respondents. In relation to initial investment, it was suggested that the approach should:

- Offer sufficient incentive to generate momentum, and to overcome any reticence that early adopters may have, particularly given the lack of clarity regarding the role of hydrogen and green gases. It was suggested that funding made available to date for Heat in Buildings has been poorly used or not taken up and that generating demand from consumers, and minimising barriers to accessing funding will be important.
- Recognise that public funding is not likely to be able to provide enough grant to meet both net zero and fuel poverty targets and that new approaches will be needed. It will be important that grant support in the short term is structured in ways that facilitate development of smart local energy systems and new business models to enable the scalability which will be required to meet the overall targets.

Concerns were also raised around the capacity of businesses and wholesalers to finance the required growth in the supply chain, particularly in the context of the financial difficulties many have encountered during the COVID-19 pandemic. There were calls for Scottish Government to reconsider support mechanisms for these businesses, for example including potential for grants and match funding rather than loans.

Expansion of existing delivery programmes was also supported, including the use of research and evaluation of these programmes to inform future products. It was described as representing an important commitment to longer-term support for energy efficiency and low/zero emissions heating, and as having benefits in terms of building confidence for investment in the supply chain. This was seen as vital in terms of providing a foundation for growth in energy efficiency and low/zero emissions heat. However, there was also a call for the extension of other programmes not referenced in the consultation document, including the Scottish Renewable heat scheme for homeowners.

Energy efficiency and retrofit: In relation to energy efficiency and whole-house retrofit, there was support for the suggested sequencing of investment set out in the consultation document. This included the front-loading of investment into energy efficiency improvements to ensure buildings are ready for decarbonised heat – although there was also a concern that these ‘easy wins’ must still be properly tailored to the specific needs of the buildings. The potential benefits in delivering ‘secondary technologies’ at this stage was also highlighted; these included small scale renewables and thermal/electrical storage as part of smart local energy systems, to ensure buildings are ready for low/zero emissions heat. However, it was also suggested that further information is required on how energy efficient existing stock needs to be to accommodate low/zero emissions heat, to ensure initial investment is used appropriately. Respondents also highlighted other areas where they wished to see further detail or greater emphasis, including:

- Further detail on how funding will incorporate sufficient flexibility to meet the distinct needs of low-income households in island, rural and remote areas. This included reference to some of the specific technologies that may be required in these areas (for example where alternatives to oil and LPG may be the initial priority), and the higher costs for major works.
- More support to encourage ‘able to pay’ households as early adopters of low/zero emissions heat, including reference to existing schemes across several EU countries as potential models for this.
- The importance of awareness raising and support to enable households to make best use of available funding. This included a suggestion that more intensive support and encouragement may be needed to persuade ‘harder to reach’ consumers to access existing delivery programmes. A role for third sector organisations to work with local communities and facilitate uptake of delivery programmes was suggested, with calls for this to be recognised and funded through the Strategy.

Support for SMEs: It was suggested that businesses should be able to proceed with confidence because of grants and loans being offered, and that this should then encourage other business to follow suit. However, some raised concerns that the Scottish Government’s proposed approach does not recognise the complexities of ownership and occupation arrangements for commercial property. These respondents suggested that this presents a risk of initial investment failing to generate the required momentum. Combining grant funding with private finance to address a wider range of non-domestic building stock was suggested, with

concerns expressed that opportunities for 'heat as a service' and energy efficiency contracting have not been attractive for rural and smaller scale buildings.

Support for communities: There was support for the focus on heat decarbonisation in community-led projects and community engagement in LHEES, although some wished to see further detail on the funding allocated to the CARES programme. It was also suggested that while CARES has focused on exploring business cases and design of new technologies, there also is a need for support to ensure these new ideas can be realised.

Role of the public sector: There was also support for the public sector taking a leadership role in the transition to low/zero emissions heat, although it was suggested that support for 'early adopters' may be required beyond 2023 as many agencies will have an initial focus on COVID recovery. There was a call for specific detail on support for public bodies to explore commercial partnerships to plan for, deliver and manage heat networks. However, concerns were raised regarding existing public sector programmes, including that they exclude certain public bodies such as NHS Boards. There were calls for a commitment that funding mechanisms for public sector deployment will be flexible in scale, technology neutral, and not limited by financial year constraints.

At scale support: There was support for a replacement scheme for the LCITP, and it was reported that the current scheme has delivered a range of projects at scale. The Scottish Government was encouraged to take account of learning from the existing scheme in the design of its successor, and to ensure that the new scheme gives equal support to innovative projects and existing projects.

Respondents also referred to specific strategic technologies and projects which they wished to see supported by the successor to LCITP, including heat networks and hydrogen storage. It was noted that heat network regulations do not come into force until 2023, and some wished to see the Scottish Government working with industry stakeholders to implement changes ahead of this timeline where possible.

Social landlords: In relation to decarbonisation of the social housing sector and affordable housing, the Social Housing Net Zero Heat Fund (SHNZHF) was welcomed as a means of supporting the transition within existing homes. However, it was noted that projects will require potentially significant 50% match funding from landlords, given the higher standards for social housing. It was suggested that this could be a disincentive to landlords installing secondary technologies such as PV generation and storage. Concerns were also raised regarding the risk that social landlords will be required to fund the transition to decarbonised heat through rental income, and the potential impact on affordability of their social housing stock. These respondents saw a need for significant additional funding for social landlords to enable targets to be met. It was also noted that support for social landlords should recognise that they will be required to transition both domestic and non-domestic buildings.

Additional Affordable Housing Supply Programme (AHSP) funds were also welcomed to support delivery of low/zero emissions heat for new homes, and it was suggested that this should commence as soon as possible to meet target

timescales. It was also suggested that this funding should exceed the SHNZHF 50% provision, given what are likely to be higher capital costs, including to meet fire suppression requirements. An expansion of the Greener Homes element of AHSP was also suggested.

Utilising UK Government funding: In terms of maximising the contribution that can be made by UK Government funding, it was suggested that elements of UK Government funding have not worked as well for Scotland as was hoped. This included reference to the RHI, and a suggestion that capital grant funding may be more effective in enabling larger projects to 'get over the line'.

Other actions

Respondents also referred to a number of other actions that fall outwith those set out in the consultation document. These included:

- A perceived need for further support for upskilling and training, over and above current skills development work. It was suggested that, while the Scottish Government commitment to low/zero emissions heat deployment will help to grow skills and the supply chain, the skills base may remain a constraint on growth in deployment of low/zero emissions heat without initial investment in skills. It was suggested that that this investment will be required by 2025 to ensure the required growth in deployment can be achieved.
- The Scottish Government was encouraged to engage with heat pump manufacturers to ensure they are prepared for a potentially substantial increase in demand. Potential shortfalls in supply of heat pumps and associated technologies were highlighted, particularly if large social landlords rapidly increase deployment. Forthcoming quality standards (set out by PAS 2035) were also seen as posing a risk of supply chain shortages, with reference to the market struggling to respond when these standards were introduced in England and Wales. There were also concerns regarding the performance of heat pumps for early adopters, as the volume of demand increases. This included reference to experience of poor performance for some existing installations.
- There were calls for a simplified process to access funding and support. This was a more frequently made suggestion, with those raising it including Housing Association, Local Authority and Public Body respondents. There was reference to the potential of one-stop-shops. There was also reference to the wide range of funding and other support mechanisms proposed, including that there is a risk of consumers and organisations failing to make best use of these due to limited knowledge and capacity.
- It was suggested that of the role of LDPs, RSSs, LPPs and place-based partnerships in kick starting investment should be recognised.
- There was a call for a reduction in VAT to 5% on work to improve the energy efficiency of a building as an incentive for homeowners to improve their homes. It was suggested that this could be achieved through a VAT reimbursement scheme for Scotland.
- Engagement with universities to provide clarity on the most appropriate low/zero emissions heat technologies was suggested.

Question 38 - Do you agree with the strategic funding priorities set out above?

Responses at Question 38 by respondent type are set out below.

Table 44

Question 38 - Do you agree with the strategic funding priorities we have set out?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	2	1	3
Community Council, Trust or Group	1	0	1
Consultancy, Training, Assessment or Accreditation	5	1	6
Consumer Advice, Advocacy or Campaigning	5	0	5
Energy Generation, Supply or Distribution	9	1	10
Housing Association	6	0	6
Individual or Tenant Group	3	1	4
Local Authority	14	1	15
Product Manufacturer, Supplier or Installer	7	2	9
Professional or Representative Bodies (Energy)	5	0	5
Professional or Representative Bodies (Other)	7	3	10
Public Body	4	0	4
Third Sector or Non-Governmental Organisation	6	1	7
Total	74	11	85
Total %	87%	13%	

Of those respondents who answered the question, a clear majority – 87% – thought there are further gaps that must be filled to support delivery of heat networks, while 13% thought that there are not.

The number of respondents making a further comment at Question 38 is set out below, with 70 respondents, or 39% of all respondents, commenting. They included some of those who had not responded to the closed ‘yes’/‘no’ question.

Consumer Advice, Energy Generation, Product Manufacturer and Third Sector respondents were amongst those making extensive comments at this question.

Table 45

Question 38: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	3%
Community Council, Trust or Group	6	0	0%
Consultancy, Training, Assessment or Accreditation	13	4	6%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	7	10%
Housing Association	9	6	9%
Individual or Tenant Group	15	4	6%
Local Authority	23	14	20%
Product Manufacturer, Supplier or Installer	19	6	9%
Professional or Representative Body (Energy)	15	2	3%
Professional or Representative Body (Other)	21	8	11%
Public Body	7	5	7%
Third Sector or Non-Governmental Organisation	14	7	10%
Total	178	70	100%
% of all respondents commenting		39%	

Many respondents, from across a broad range of respondent types, expressed general support for the four strategic priorities, and the breadth of issues they address. This included specific support for the priority given to those least able to pay and for supporting innovation. Some respondents also commented on one or more of the strategic priorities.

Priority 1: Supporting those least able to pay

There was strong support for investment focused on those least able to pay, and particularly a focus on improving energy efficiency. However, it was also suggested that the aim should be to reduce fuel poverty rather than to only avoid any increase in fuel poverty. It was also suggested that investment must ensure that energy efficiency works are compatible with future conversion to low/zero emissions heat or, ideally, should upgrade heating systems at the same time as improving energy efficiency.

The importance of ensuring that support for those least able to pay is tenure neutral was highlighted, recognising the needs of homeowners who may struggle to heat their home, and would be unable to meet the capital costs of low/zero emissions heat. There was also some concern that the focus on those currently in fuel poverty may miss those who are not in receipt of passport benefits and are currently just able to pay, but who cannot afford any increase in heating costs and do not have savings to meet the capital costs of low/zero emissions heat. It was suggested that

this could apply to a large number of households and that financial support should be extended to include this group.

Priority 2: Investing in strategic technologies in low or no regrets areas

There was support for investment in strategic technologies that can be deployed in the short-term with little or no risk, also supporting the sharing of learning across local authority areas and sectors. This included a suggestion that high priority should be assigned to buildings with high heat demand in Heat Network Zones, to allow these to become heat anchor loads.

However, there was also concern that low or no regret options may have limited overall impact on emissions, and some respondents wished to ensure that this investment is tailored to individual buildings to maximise impact. There was also concern that this should not be at the expense of developing technologies with potential longer-term impact. This included reference to the importance of building post-install capacity in areas such as technical support, behaviour change, heat as a service and aggregation opportunities.

There was a call for the definition of strategic technologies to be widened to provide room for flexibility. This included calls for specific recognition of hydrogen, shared ground loops and ambient heat networks as strategically important technologies.

Priority 3: Showcasing net zero leadership and sharing learning

It was suggested that the Scottish Government and other public bodies should commit to using investment in their buildings to provide net zero leadership and help to support initial growth of the supply chain. Others raised concerns that this could lead to use of public funds to support products which prove unviable, including a reputational risk if the Scottish Government is seen to be closely allied to these projects.

There was also a call to support and enable pilot schemes at community scale.

Priority 4: Investing in innovation and demonstration

There was support for the role that innovation and demonstration can play in establishing 'technologies of the future', thus continuing to support the transition to heat decarbonisation, and helping to increase future affordability of technologies. There was also a call to develop models to overcome existing barriers to low/zero emissions heat deployment.

However, others suggested that investment in innovation should be limited, on the basis that Scotland is likely to have access to outputs from demonstrator projects elsewhere in the UK and internationally, and the availability of other sources of innovation funding.

Other priorities identified

In addition to comments on specific priorities, some suggested that the four strategic priorities did not include sufficient recognition of specific issues for heat decarbonisation. This included specific reference to a perceived need for:

- Investment in upskilling and training to support growth in the supply chain.

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- Support for the ‘able to pay’ (including homeowners and landlords) likely to represent a large proportion of Scotland’s housing stock. This was a frequently raised issue, with Consumer Advice and Professional Body (other) respondents amongst those highlighting it.
- Greater emphasis on developing the electrical infrastructure to support the transition, particularly in rural areas.
- Investment in traditional and non-traditional building stock requiring more specialist solutions.
- Support to social housing providers and tenants to facilitate the transition to decarbonised heat.

Some also wished to see a clearer recognition of ensuring a just transition as a key strategic priority. This included reference to use of heat decarbonisation to support sustainable economic growth and calls for further assessment of all elements of heat decarbonisation to identify sectors and population groups that may be negatively affected.

It was also suggested that the strategic priorities do not take account of the impact of the COVID-19 pandemic, particularly in relation to the number and type of businesses with capacity to invest in the transition. It was suggested that the impact of the pandemic needs to be assessed, with the strategic priorities reviewed in light of this assessment.

Question 39 - In your view, should equal funding be allocated across these priorities or should certain priorities be weighted in terms of impact for Scotland?

The number of respondents answering Question 39 is set out below, with 72 respondents, or 40% of all respondents, answering.

Table 46

Question 39: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	3%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	4	6%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	9	13%
Housing Association	9	8	11%
Individual or Tenant Group	15	4	6%
Local Authority	23	14	19%
Product Manufacturer, Supplier or Installer	19	7	10%
Professional or Representative Body (Energy)	15	3	4%
Professional or Representative Body (Other)	21	6	8%
Public Body	7	4	6%
Third Sector or Non-Governmental Organisation	14	5	7%
Total	178	72	100%
% of all respondents commenting		40%	

Many respondents, from across a broad range of respondent types, thought that some sort of prioritisation of funding would be appropriate. This included the frequently made suggestion that funding should be linked to the likely impact of each priority – in terms of making progress in the transition to decarbonised heat. It was also noted that funding allocation can be modified over time as evidence is gathered on relative impact and/or as innovation develops and new technologies emerge.

There was also frequent reference to the variation in the challenges facing heat decarbonisation across Scotland. Local Authority, Public Body and Third Sector respondents were amongst those highlighting this issue. There was an associated call to vary the allocation of funding in relation to geographic areas and industry sectors. This included noting the role of LHEES in directing funding across geographic areas, taking cognisance of rates of fuel poverty and acknowledging the specific challenges facing rural and island communities. In addition to suggestions for how funding might be prioritised, there were also calls for the Scottish Government to publish a clear statement of how funding is to be allocated across the priorities.

A small number of respondents preferred an initial equal allocation of funding. These respondents also noted the need to use funding to build the supply chain

and installer capacity for current technologies and saw potential for funding allocation to be adjusted over time as the impact of each priority is monitored.

Most respondents discussed the relative weighting of the four strategic funding priorities.

Priority 1: Supporting those least able to pay

Many respondents, from across a broad range of respondent types, wished to see the highest weighting given to supporting those least able to pay, with support for energy efficiency measures and smart controls. Concerns were raised around the potential for decarbonisation of heat to reverse progress made in tackling fuel poverty and it was suggested that additional funding to this priority is likely to have a more direct impact on carbon emissions. It was also suggested that consideration could be given to including 'able to pay' households living alongside those least able to pay, taking advantage of economies of scale and funding for third sector organisations to support those least able to pay.

Priority 2: Investing in strategic technologies in low or no regrets areas

There was also support for investing in strategic technologies in low or no regrets areas. Again, it was noted that this priority offers an opportunity to have a more direct and rapid impact on carbon emissions, particularly in comparison with priorities 3 and 4. The connection between priorities 1 and 2 was highlighted with a call for specific funding targeted to least able to pay in low or no regret areas.

Priority 3: Showcasing net zero leadership and sharing learning

While there was support for showcasing net zero leadership and sharing learning, this was seen as less of a priority than others. For example, it was suggested that the associated actions are less clearly defined and are likely to have a less direct impact on carbon emissions – or that more time may be required to see those impacts. However, a small number of respondents supported a higher funding allocation to support organisations demonstrating leadership in net zero technologies. This included a suggestion that these early adopters are likely to pay higher costs, and that public bodies in particular may require additional support to meet these.

Priority 4: Investing in innovation and demonstration

Investing in innovation and demonstration was also seen as less of an immediate priority, with some respondents of the view that investment in innovation and demonstration is likely to require more time to have a demonstrable impact on carbon emissions. It was also suggested that investment in innovation is more likely to be supplemented by private sector funding. However, some wished to see a greater allocation of funding for this priority, particularly in comparison with priority 3. This included concern that the Scottish Government should not focus too much on 'low hanging fruit', to the detriment of the pilot schemes and demonstration projects required to maintain progress over the longer term.

Question 40 - What are the opportunities and challenges we face in maximising our £1.6 billion investment?

The number of respondents answering Question 40 is set out below, with 81 respondents, or 46% of all respondents, answering. Academic respondents were amongst those making extensive comments at this question.

Table 47

Question 40: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	7	9%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	6	7%
Housing Association	9	6	7%
Individual or Tenant Group	15	5	6%
Local Authority	23	16	20%
Product Manufacturer, Supplier or Installer	19	8	10%
Professional or Representative Body (Energy)	15	4	5%
Professional or Representative Body (Other)	21	7	9%
Public Body	7	6	7%
Third Sector or Non-Governmental Organisation	14	6	7%
Total	178	81	100%
% of all respondents commenting		46%	

Respondents cited a broad range of specific challenges and opportunities for the £1.6 billion investment. This included reference to Scottish Government’s estimates of the total cost of transition at £33 billion, and other research estimating the required energy efficiency improvements to Scotland’s housing stock.

The most frequently raised concern, highlighted by a range of respondent types, was that the £1.6 billion falls short of what will be required, and there were calls for further detail on how public funds will be used to leverage private investment.

The diversity of funding priorities, and the number of associated actions, was seen as a challenge in terms of the risk that public funds would be ‘spread too thinly’ to have a significant impact. It was also suggested that these priorities may evolve over time, for example as technologies develop, and as such it may be prudent to retain some funding to respond to any future changes.

Ensuring a co-ordinated, balanced approach to investment in housing stock, including in relation to energy efficiency and low/zero emissions heat, was also seen as a key challenge. It was suggested that investment must be balanced between shorter term investment in easier to treat and more cost effective interventions, and ensuring funding is available in the longer term for more challenging or costly retrofit.

Other specific challenges for investment cited by respondents are outlined below:

- **Facilitating access to funding and support.** Respondents suggested it will be key to ensure that investment is accessible to all stakeholders and is not restricted to specific technologies or project types. This included concerns regarding capacity of delivery funding programmes, and a perceived need for a mechanism to support businesses to access funding and support.
- **Directing public funds and securing private investment.** It was suggested that, while private capital should be available, identifying viable projects for investment is likely to be a significant challenge. There was reference to the importance of being able to demonstrate the scale of projects, and the returns available to investors. Implementing a robust monitoring and evaluation framework was identified as a key challenge in this context. More widely, there was reference to how investment should be balanced between energy efficiency improvements, and installation of new low/zero emissions heating systems. Again, it was suggested that robust monitoring data will be required to inform this balance and to maximise the return on investment.
- **Building the supply chain.** A more frequently raised issue was that there will be a challenge in ensuring that industry is ready to respond to the decarbonisation programme. Consumer Advice and Local Authority respondents were amongst those this making this point. It included having the capacity to support the required pace of deployment, the skills to ensure effective deployment of technologies, and quality assurance processes to reassure consumers. Specific challenges for remote rural and island communities, in terms of establishing and maintaining the supply chain at sufficient scale to be viable, were raised. The impact of the COVID-19 pandemic on industry was also seen as adding to the challenge of building the supply chain.
- **Harder to treat properties.** Reference was made to the potential volume of 'hard to treat' properties, and the impact on the overall cost of the transition to decarbonised heat. This included specific challenges for buildings in off-gas grid areas and for pre-1919 buildings. The potential for PAS 2030/2035 to add to costs for energy efficiency and low/zero emissions heat was also noted. This was seen as presenting challenges for rural and island communities.
- **Consumer attitudes and demand.** Some respondents suggested that consumer understanding of and confidence in low/zero emissions heat remains low and saw a need to address this to generate the demand required for the transition to decarbonised heat. This included concern around the extent to which the transition will require a substantial number of households to invest in the deployment of low/zero emissions heat, and reference was

made to the relatively small numbers who have done so to date without some form of subsidy.

- **Impact on fuel poverty.** It was argued that the transition to decarbonised heat carries a risk of increasing fuel poverty. This was described as a challenge in the context of the requirements of Energy Efficient Scotland standards.
- **Capacity within the planning system.** The role of planning authorities in supporting deployment of low/zero emissions heat was highlighted as a potential challenge. There were concerns that planning authorities are not sufficiently resourced to support the anticipated pace of deployment, particularly the design and delivery of programmes such as LHEES and area-based schemes. It was also suggested that there is limited understanding of low/zero emissions heat technologies within the planning system.
- **Suitability of building regulations.** To avoid development of new buildings with poor performance and additional costs for future decarbonisation it was argued suitable building regulations are required.
- **Robustness of the electricity grid.** It was suggested that the electricity grid across parts of Scotland is not robust enough to support decarbonisation of heat, as well as other emerging priorities, such as around charging of electric cars.
- **Fossil fuel sector.** There were concerns about the impact of lobbying from the fossil fuel industry, and potential for this to limit the pace of decarbonisation.

While some respondents raised significant concerns around the challenges facing Scottish Government investment, and its capacity to deliver the required scale of change, others saw clear opportunities to maximise the impact of funding, as summarised below.

Building the supply chain

Respondents referred to the importance of ensuring a sufficient pool of skilled engineers, and robust accreditation and quality assurance systems to ensure investment supports effective work. These were seen as vital in terms of supporting deployment of technologies and building consumer confidence. It was also suggested that the pool of skilled installers remains relatively small for some technologies, and there was a perceived need for significant growth in the supply chain to support the required scale of deployment. It was recommended that the Scottish Government should review the current supply chain skills base to inform the drive to increase capacity. Respondents also saw a need for a coordinated approach to the transition and building of the supply chain, including a suggested role for a central coordinating agency.

Leveraging private finance

As noted earlier, concerns were raised around the level of private finance required to deliver the transition to decarbonised heat, although respondents noted that the long-term policy support and commitment of public funding would help to build the confidence required to realise private investment. Respondents also referred to a

number of opportunities for public funding to leverage private investment as technologies mature and the supply chain develops. This included reference to specific tools/models with potential to leverage investment, and the potential value of pilots and demonstrator projects in evidencing potential of specific technologies to achieve the scale of transition required.

It was also suggested that Scottish Government should identify business models which can finance the whole zero emissions heat pathway, rather than allowing investors to 'cherry pick' which interventions to support. This reflected some concern that allowing private investors to focus primarily on the most profitable interventions could leave public funding insufficient to finance the higher risk interventions required to deliver the transition.

Investment in existing delivery mechanisms, technologies and projects

Some respondents suggested use of funding to support existing delivery mechanisms, low/zero emissions heat technologies and projects/partnerships. This included suggestions that, given the scale of change required, existing programmes and partnerships may be best placed to deliver a rapid increase in deployment. Reference was made to the diversity of potential demonstrator projects and technologies which can make meaningful contributions to decarbonisation of heat. Respondents also referred to specific delivery mechanisms such as the Scottish District Heating Loan Fund and Heat Pump Sector Deal.

Building consumer confidence and demand

While some respondents reported growing public awareness of climate impacts and the need for action, others suggested that building consumer understanding and confidence in low/zero emissions heat is needed to generate the consumer demand required to support the transition. In this context, respondents highlighted the importance of clear, long-term policy support for the decarbonisation programme, with appropriate financial support and incentives, and an effective ongoing communications strategy. Existing local hubs were highlighted as having a contribution to make to the wider communications strategy, for example using local trusted organisations and utilities to work with local communities.

There was also reference to the potential value of effective advice and support services in realising the required consumer demand for low/zero emissions heat. This included suggestions for a 'one-stop-shop' providing advice and information for consumers, including on energy efficiency upgrades and selection of low/zero emissions heat technologies.

There was a call for investment to be directed at supporting early adopter homeowners to take up low/zero emissions heat. This was seen as having potential to build momentum in the transition. There were also suggestions that there may be a need to extend this support beyond the proposed 2023 date, if it takes time to build consumer demand following the impact of the COVID-19 pandemic.

'Fabric first' approach

There was support for initial investment in energy efficiency improvements as part of a fabric first approach to maximise the impact of initial investment. This included

reference to the proportion of Scotland's housing stock estimated to fall short of the EPC rating required for low/zero emissions heat, and the longer-term benefits of effective energy efficiency upgrades. This included reference to research highlighting the importance of fabric first improvements freeing up household spending. There was also a call for the use of pre- and post-installation performance measurement to track impact.

Specific technologies

Respondents referred to a number of specific technologies as having potential to maximise the impact of investment, with reference to reducing pressure on the electricity grid and leveraging private investment. These included shared ground loops, battery storage, and on-site small-scale renewable energy. There was also a call for investment supporting a broader range of technologies, with concern that consultation proposals are focused too heavily on heat networks and heat pumps. Other comments included that investment in low/zero emissions heat options should not work against the future development of other energy sources, such as hydrogen.

Other opportunities to maximise the impact of funding were suggested in relation to:

- **Fuel poverty and those less able to pay.** Respondents suggested that the initial focus for public funding should be on the most vulnerable households, including those in or at risk of fuel poverty. This was a more frequently made suggestion with Consumer Advice, Local Authority, Public Body and Third Sector respondents amongst those making this suggestion. There was a call for public funding to target a reduction in the number of fuel poor households, rather than 'only' seeking to avoid an increase in fuel poverty.
- **Place-based interventions.** It was suggested that a focus on place-based interventions could generate the greatest return on investment. This included reference to the role of LDPs and LPPs in co-ordinating interventions. Place-based interventions were also cited as a potential approach to addressing fuel poverty, for example by focusing on areas with a higher density of households affected by deprivation.
- **Adapting the decarbonisation programme.** It was suggested that funding will be needed for monitoring and evaluation so we can learn and adapt the programme(s) based on evidence and experience.
- **Funding local authorities to de-risk heat networks.** The potential for local authorities to undertake early enabling work to reduce the investment risk associated with heat networks was highlighted. This included reference to mapping of infrastructure and upgrading of power supply and online connectivity.
- **Wider benefits of decarbonisation.** Quantifying the wider benefits of decarbonisation was also recommended as a key aspect of demonstrating a viable business case for investments and justifying longer-term interventions. This included reference to reducing hospitalisations and cutting social care costs as a result of healthier homes.

Question 41 - What are your views on the role of government funding over the next five years? For example, should it be focused towards significant increases in the volume of renewable heat and energy efficiency measures installed or more targeted at specific priority groups or technologies?

The number of respondents answering Question 41 is set out below, with 90 respondents, or 51% of all respondents, answering. Consumer Advice and Housing Association respondents were amongst those making extensive comments at this question.

Table 48

Question 41: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	4	4%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	8	9%
Consumer Advice, Advocacy or Campaigning	8	6	7%
Energy Generation, Supply or Distribution	20	9	10%
Housing Association	9	7	8%
Individual or Tenant Group	15	5	6%
Local Authority	23	16	18%
Product Manufacturer, Supplier or Installer	19	8	9%
Professional or Representative Body (Energy)	15	5	6%
Professional or Representative Body (Other)	21	10	11%
Public Body	7	5	6%
Third Sector or Non-Governmental Organisation	14	6	7%
Total	178	90	100%
% of all respondents commenting		51%	

The range of views on the role of government funding were split between those supporting a more targeted approach and those prioritising volume deployment. Specific points raised in relation to each of these positions are considered below. However, a number of considerations were also highlighted as important in directing government funding, irrespective of the preference for a targeted or volume approach, namely:

- **Co-ordination:** Respondents highlighted the importance of a co-ordinated approach to securing the transition to decarbonised heat, supported by a long-term framework with clear timelines and targets. Regulation and building the supply chain skills base were also highlighted as priorities. This included suggestions for sequencing of investment, for example an initial focus on low

or no regret areas to build the supply chain required for subsequent volume deployment across Scotland.

- **Front-loading of funding:** There was some support for front-loading of government funding. This was primarily highlighted in relation to building the supply chain and driving momentum in the transition to decarbonised heat, although the opportunity to help support a green recovery was also noted.
- **Longer term sustainability:** Others highlighted the need to ensure the longer-term sustainability of the transition to decarbonisation. This was in terms of maintaining momentum to meet government targets, overcoming barriers to homeowners decarbonising their homes, and recognising that priorities such as fuel poverty are unlikely to be resolved in the short-term. In this context there was support for use of government funding to: enable development of the required energy infrastructure; support ongoing development of the supply chain through funding for skills development and professional development; reduce capital costs and de-risk investment in low/zero emissions heat; and drive demand in the 'able to pay' market.
- **Engagement with the industry and potential private investors:** This was connected to maximising the impact of government funding and there was reference to engagement with the low/zero emissions heat supply chain, energy infrastructure and across sectors where learning and good practice may be gathered (including utilities such as water). In terms of leveraging investment, there was a concern that this could be challenging while the risk associated with low/zero emissions heat remains relatively high, and likely investment returns relatively low. It was suggested that the Scottish National Investment Bank and UK Infrastructure Bank could have a role to play, including by taking on some of the delivery and technology risks in the early stages of the transition.

Preference for targeted approaches

There was clear support, from across a range of respondent types, for a more targeted approach, including to have some focus on those in or at risk of fuel poverty. Respondents also wished to see dedicated support for other low income households and those in rural and island communities, including support for the role of Area Based Schemes.

However, others wished to ensure that support for these groups would not wholly exclude 'able to pay' households. This included suggestions that an initial targeting of households in or at risk of fuel poverty could generate economies of scale, allowing delivery to 'able to pay' households in neighbouring properties or areas who may lack the savings to meet upfront capital costs.

Others advocated targeting priority groups with the greatest needs whilst also supporting deployment at scale. This was connected to a view that, while those in fuel poverty are rightly identified as a priority, expanding support to other households and exploring future technologies will be necessary to achieve the scale of deployment required by government targets.

One perspective was that different priorities may require tailored approaches. There was reference to the need to consider specific challenges across different areas, including for example rural or urban areas, or areas affected by deprivation. More widely, it was also suggested that the more centralised approaches used to date have been effective in supporting households in easier to treat properties, but that a more localised approach could be effective in tackling harder to treat cases, including through support for behaviour change. There was a call for government funding for third sector organisations providing this more intensive support at a local level.

In terms of other aspects of a more targeted approach, the main points raised by respondents were in relation to energy efficiency improvements, particular technologies and hard to treat properties. Fabric first improvements were said to offer the potential to improve the effectiveness of any future deployment of low/zero emissions heat systems and come with low or no risk. This was contrasted with the risk that technological advances could mean that current low/zero emissions heat installations become out-dated in a short period of time. There was support for a mix of targeted grants (for fuel poor and those least able to pay) and interest-free or low-interest loans (for those able to pay). A leadership role was suggested for public bodies, using energy efficiency improvements to public sector buildings as a means of building public acceptance and supply chain capacity.

In terms of whether particular technologies should be prioritised for public funding, it was suggested that there should be focus on those which can have the greatest impact on reducing emissions. A connected point was that 'lowest cost of heat' and 'lowest cost of carbon' should be used as key metrics to ensure the most cost-effective carbon savings are prioritised, rather than lowest capital costs. Specific technologies seen as priorities for government funding included heat pumps, renewable energy and development of commercial trials of hydrogen, although it was also suggested that the latter should only be considered where other zero or low emissions heating systems are not feasible).

It was also suggested that 'hard to treat' property types should be prioritised, especially where homeowner funding is less likely to be sufficient to meet capital costs. There was specific reference to pre-1919 buildings, and mixed tenure properties.

Volume deployment

There was also some support for a greater emphasis on volume deployment of low/zero emissions heat. This included suggestions that an approach focused on specific groups would not achieve the required speed of deployment, although some noted that those in fuel poverty should remain a priority within a volume-based approach. Specific suggestions included:

- Government funding focused on low or no regret options including energy efficiency improvements and deployment of low/zero emissions heat. This included support for 'whole house' retrofit as a means of securing rapid progress. However, concerns were raised around the extent to which government funding expects consumers to bear at least some of the cost of deployment. It was suggested that more targeted funding may be required to

support homeowners to overcome the initial capital cost of low/zero emissions heat, particularly in the early stages while low/zero emissions heat costs remain high.

- A range of support mechanisms to achieve the required scale of deployment amongst 'able to pay' households. This included reference to grants and low-cost finance to overcome capital costs, provision of reliable advice and information, and quality assurance and consumer protections. There were also calls for specific support for social landlords, in addition to the SHNZHF, to enable delivery of energy efficiency measures and whole house retrofit at scale, and to ensure these are not funded solely through rents.
- A technology agnostic approach to decarbonising heat. However, others referred to specific infrastructure and technologies as having potential to support volume deployment of low/zero emissions heat, including ambient heat networks and shared ground arrays.

Question 42 - What are your views on how we can use our funding to leverage and encourage private sector and other forms of investment?

The number of respondents answering Question 42 is set out below, with 78 respondents, or 44% of all respondents, answering. Product Manufacturer respondents were amongst those making extensive comments at this question.

Table 49

Question 42: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	6	8%
Consumer Advice, Advocacy or Campaigning	8	6	8%
Energy Generation, Supply or Distribution	20	9	12%
Housing Association	9	3	4%
Individual or Tenant Group	15	5	6%
Local Authority	23	15	19%
Product Manufacturer, Supplier or Installer	19	9	12%
Professional or Representative Body (Energy)	15	4	5%
Professional or Representative Body (Other)	21	11	14%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	4	5%
Total	178	78	100%
% of all respondents commenting		44%	

As noted at Question 40, respondents expressed some concerns regarding the extent to which government funding will be sufficient to leverage the required investment to meet targets for decarbonisation of heat. It was suggested that the Scottish Government is likely to face challenges in engaging private sector and other forms of investment, and that significant work will be needed to secure the required investment. However, most of those commenting suggested approaches that may help to leverage and encourage investment in the transition to decarbonised heat. These are summarised below.

Long-term support to encourage investment

Long-term, clear policy support was highlighted as a key element in encouraging private investment to support the decarbonisation of heat. This was seen as essential in building confidence within the private sector and encouraging the investment in skills and infrastructure required to drive down costs and support the transition. In addition to clarity on policy, it was also suggested that the approach must ensure confidence in the quality of the supply chain, the robustness of regulation, and effectiveness of accreditation.

In terms of how government funding may be used to encourage investment, there was a view that targeting of investment in the early years of the strategy would maximise impact by supporting the supply chain and driving interest and demand from the private sector. Specific suggestions included:

- Targeting of initial investment to specific groups could be effective in demonstrating impact and encouraging a self-sustaining investment market. This included suggestions for targeted financial support to low income and fuel poor households, off-gas-grid properties, and hard to treat property types.
- The Scottish Government and local authorities should use their purchasing power as leverage and use investment in the public estate to support deployment of decarbonised heat at scale, build the supply chain, and stimulate investment. This reflected a wider view that achieving scale in deployment of technologies, such as heat pumps and heat networks, will be crucial in reducing capital costs. Investment in social housing was also suggested as a means of supporting the supply chain by generating a forecast volume of work.
- Providing dedicated support to build the supply chains for energy efficiency and low/zero emissions heat providers. This included a perceived need for skills development programmes. It was suggested that this approach could be aligned with wider economic recovery programmes.
- Using early investment to improve awareness of energy efficiency and low/zero emissions heat technologies, and to build confidence in the supply chain to encourage investment. This was highlighted primarily in relation to consumer awareness and confidence (including, for example, proposals for a consumer redress fund), but was also linked to a need to improve understanding of technologies across all stakeholders.

Priorities for government funding

Respondents referred to a number of potential ongoing priorities for government funding. These included support for the role of existing delivery programmes (such as Energy Efficiency Business Support, Green Network for Business, Renewable Heat Incentive scheme and Green Investment Portfolio) as ways to leverage further investment. Other priorities suggested included:

- Supporting innovation and demonstration projects. This included a focus on identifying scalable projects which can attract private investment to take forward viable technologies.
- Focusing on area-based initiatives, including as a means of demonstrating impact and developing a clear project pipeline. It was suggested that, by demonstrating the potential to deploy low/zero emissions heat at scale, these more focused projects may be more attractive than activity spread across a wide geographic area. One proposal was for initiatives focused on fuel poverty and/or social housing decarbonisation, which could be extended to include able to pay households to make use of economies of scale. There was also reference to the potential value of designating regeneration areas where there are concentrations of poorly performing buildings requiring energy efficiency upgrades.
- Using funding of area-based projects to support local business, enabled by flexibility in procurement approaches. It was suggested that this may be particularly important in developing the supply chain in rural and island areas where the supply of suitably qualified installers is likely to be more limited.
- Funding for specific technologies. This included a focus on use of government funding to meet capital costs of heat networks to help de-risk private investment, shared ground loops, and alternative heat sources including hydrogen and biogas.

Potential financing models

There was also support for a range of potential financing models to take forward decarbonisation of heat, and to facilitate private investment. This included support for the role of the Green Finance Taskforce in providing advice and recommendations on potential financing mechanisms and working collaboratively with the private sector. There was also reference to a role for the Scottish National Investment Bank in directing funds into each of the four strategic priorities for low/zero emissions heat; this was connected to a wish to see a pledge of £2 billion of funding over 10 years.

It was suggested that a broad range of financing mechanisms are likely to be required, including a mix of those targeting individual households, owners of non-domestic buildings, and other private investors. Specific suggestions included: government-supported low or zero interest finance; green mortgages (including support for voluntary targets to improve the average EPC of lenders' mortgage portfolios); equity loans; collective purchase; community asset ownership; gap funding by Scottish Government to encourage homeowner investment; Heat as a Service and leasing arrangements; on-bill financing; the Property Assessed Clean Energy (PACE) model; tax incentives including reference to reduced VAT rates and

discounts to Council Tax, business rates, land and buildings tax, and stamp duty; salary sacrifice; and green bonds. There was also reference to a wider reform of the business rates system, including empty property rates charges, to encourage energy efficiency improvements and low/zero emissions heat.

Respondents also referred to the importance of greater clarity on the viability and levels of return for specific investments. This included suggestions that some technologies or aspects of decarbonisation are likely to be less attractive to investors than others and may require a combination of public and private funding to reduce investment risk. For example, it was noted that the typical forms of return on infrastructure investment, such as revenue from the delivery of a service, operation or sale of an asset, do not apply to aspects of building decarbonisation. There was support for applying business models for smart metering/data and flexible power solutions to low/zero emissions heat and energy efficiency markets. The specific challenges associated with securing investment in heat network developments, for example in terms of guaranteeing consumer demand, were noted.

Finally, it should be noted that some concerns were raised around potential approaches to leveraging investment. These included a perceived need to ensure that the focus on strategic priorities for low/zero emissions heat is maintained irrespective of the source of investment. For example, it was suggested that the private sector must be harnessed to support the full range of identified priorities, rather than choosing to support only the most profitable. In this context, robust monitoring of the impact of investment was seen as a priority.

Other requirements or options

In addition to specific financing mechanisms, respondents also suggested that legislation and regulation may be necessary to realise private investment in decarbonised heat, with comparison drawn with ECO. This included calls to bring forward the timeline for the requirement for new build homes to use low/zero emissions heating systems, to require development through the AHSP to meet standards for low/zero emissions heat, and to review fuel levies to ensure parity between renewable and carbon-based fuels. However, it was also suggested that the regulation route should only be pursued if other approaches provide ineffective.

There was also support for use of funding to encourage and support public/private partnerships, for example by ensuring that local authorities are sufficiently resourced to support these and to effectively engage with the private sector. A positive experience of similar partnerships elsewhere in the UK was reported.

The importance of encouraging investment from 'able to pay' homeowners was also highlighted, with a connected suggestion that some homeowners may be reluctant to invest in energy efficiency and low/zero emissions heat. Proposals included support for 'nudge' incentives and other approaches to encourage behaviour change and investment in energy efficiency – for example, highlighting how households' energy use compares to the average, or establishing energy efficiency and low carbon as 'social norms'.

Finally, the potential to draw on learning from current and previous initiatives was noted. This included reference to Scottish Government or UK Government programmes such as those run by Home Energy Scotland, the UK Government Community Energy Programme, the RHI scheme, and Business Growth Accelerator. It was also suggested that relevant learning points could be taken from the approach to growth taken across other sectors, including the transition of onshore and offshore wind from ‘pre-commercial’ technologies, and the expansion of electric vehicle charging infrastructure.

Question 43 - What are your views on the effectiveness of our existing delivery programmes in supporting different client journeys, including for those in or at risk of fuel poverty? (for example, landlords, home owners, non-domestic building owners – public and private, domestic and non-domestic tenants). In your opinion, are there any gaps in support?

The number of respondents answering Question 43 is set out below, with 71 respondents, or 40% of all respondents, answering. Energy Generation and Third Sector respondents were amongst those making extensive comments at this question.

Table 50

Question 43: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	3	4%
Consultancy, Training, Assessment or Accreditation	13	2	3%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	7	10%
Housing Association	9	6	8%
Individual or Tenant Group	15	5	7%
Local Authority	23	15	21%
Product Manufacturer, Supplier or Installer	19	6	8%
Professional or Representative Body (Energy)	15	4	6%
Professional or Representative Body (Other)	21	9	13%
Public Body	7	2	3%
Third Sector or Non-Governmental Organisation	14	6	8%
Total	178	71	100%
% of all respondents commenting		40%	

There was reference to government support being essential in supporting the deployment of energy efficiency upgrades and low/zero emissions heat. This was

primarily focused on financial support to overcome the capital costs for lower income households and those without sufficient savings. However, respondents also referred to evidence of the proportion of households that experience barriers to taking up low/zero emissions heating, in addition to cost.

Support requirements

In this context, respondents commented on the suitability of available support for a range of specific groups. These comments are summarised below.

Fuel poverty: It was suggested that fuel poor and other vulnerable households are well served by existing delivery programmes. However, while a number of delivery programmes include a specific focus on vulnerable households, some saw a need for more tailored, holistic support to ensure that funding and support fit the specific needs of individual households. This included support for a proposed Energy Carer model.

Rural and remote areas: Rural and remote communities were identified as requiring more intensive support to realise take-up of low/zero emissions heating, including reference to the success of local community organisations in engaging with lower income households in these areas. There was also concern that the limited supply of certified engineers and installers could limit take-up of low/zero emissions heating. This included examples of difficulties identifying installers to deliver energy efficiency programmes due to limited local capacity.

Hard to treat properties: There were calls for additional support for those in hard to treat properties, including low and zero interest loans. This included reference to historic buildings, flatted properties and tenement blocks, mixed tenure buildings, and specialist housing developments.

Homeowners: Support for 'able to pay' homeowners was identified as a gap in existing delivery programmes, and there was a perceived need for more support for this group to generate investment to deliver the required scale of deployment. This included calls for access to low-cost finance to enable homeowners to meet the capital costs of low/zero emissions heat, supported by comprehensive advice and support services. However, others suggested that the 'able to pay' market includes a potentially substantial number of households who are not fuel poor, but who still require assistance to meet the capital costs of low/zero emissions heat.

Private landlords: As with homeowners, it was suggested that there is a need for a more comprehensive range of financial supports, together with advice services, for landlords. This included suggestions that new approaches may be required in the PRS, taking account of the imbalance between landlords meeting capital costs and tenants benefitting from reduced energy bills. Respondents also noted that tenants are often limited in the improvements they are permitted to make to property without landlord approval, with some calling for more work to ensure landlords make the required improvements.

Social landlords: It was suggested that social landlords are expected to deliver decarbonisation alongside other energy efficiency improvements, with limited

support. There were calls for more financial support for social landlords, including specifically for retrofit.

Public bodies: It was reported that existing programmes have not been effective in supporting decarbonisation for some sectors, including NHS assets and the higher education sector.

Non-domestic building owners: A gap in support for industrial and commercial buildings was suggested, particularly following closure of the Non-Domestic RHI. There was concern that these building owners will be faced with significant cost differences favouring fossil fuel heating over low/zero emissions heating, and there were calls for more support for the sector to maintain progress in decarbonisation of heat. This included calls for additional support specifically tailored to SMEs, including suggestions that this should be incorporated within existing business support services. The importance of longer timescales for funding for the non-domestic sector was also suggested, recognising the time required for building owners to approve investment decisions. It was also suggested that programmes focused on 'innovation' do not always meet the needs of this sector.

Delivery programmes and support

Respondents referred to a number of existing delivery programmes. This included a view that these programmes have had success in driving uptake of energy efficiency and low/zero emissions heat upgrades, and that they are comprehensive enough to avoid any gaps in support. There was a call for the Scottish Government to ensure that successor programmes are ready well in advance of closure of existing programmes, to avoid any gaps in support.

However, others suggested that there was scope for greater take-up of available support, and that the client journey could be improved to ensure the right support and technologies are matched to the right consumers. This included reference to examples of programmes failing to properly tailor deployment to the specific needs of each building, and concerns that this is a particular issue for historic buildings. There was support for integration of PAS, TrustMark and MCS processes to ensure delivery programmes select the correct technologies for each property, and to ensure consumer protections. The importance of LHEES in ensuring appropriate targeting and effective area-based solutions was also highlighted.

The diversity of the funding and support landscape in Scotland was also seen as a potential barrier to take-up, with concerns that this can be overwhelming for potential applicants. This appeared to be primarily related to domestic households, although the challenges for non-domestic building owners required to make multiple funding applications for housing development, renewables and energy efficiency measures was also noted. There were calls for access to support to be streamlined, including proposals for a one-stop-shop or similar model, and wider campaigns to raise awareness of available programmes. A need for rationalisation of existing programmes to streamline delivery and secure savings was also suggested.

Respondents also commented on a number of specific delivery programmes. This included support for the work of Home Energy Scotland to date, although it was noted that take-up of finance has remained relatively low. It was suggested that

streamlining the application process, changing the requirement for work to be completed before release of funds, and closer links with other funding sources could improve take-up. Additional funding to help Home Energy Scotland play a wider role engaging with local authorities and others to develop programmes of work was also proposed. There was also reference to LCITP, including concerns that short timescales may be limiting the scheme's effectiveness.

Positive experiences were also reported in relation to other delivery mechanisms including Home Energy Efficiency Programmes for Scotland (HEEPS) including Area-Based Schemes, the Scottish Green Public Estate Scheme, and the Warmer Works programme (seen as having had a particular impact in urban areas).

Other specific comments or suggestions about the range and type of support required included that:

- There is scope for more use of public-private partnerships to support delivery of energy efficiency and low/zero emissions heat.
- There is a need for mechanisms to reduce the cost of low/zero emissions heating for end users, with comparisons drawn with the effectiveness of the Renewable Transport Fuel Obligation model for road transport.
- Existing delivery programmes lack support for development of split ownership funded shared ground arrays and ambient heat networks.
- Post installation support is a key aspect of the consumer journey but has been a gap in available support to date. In this context, there was support for the proposal for a self-funded pre- and post-installation service, and reference to existing servicing programmes as a potential model for this.
- 'Renovation roadmaps' can be used as a means of detailing the steps that homeowners and landlords can take to progress to low/zero emissions heating and encouraging behaviour change for consumers. It was suggested that this could be linked to the revised EPC methodology.
- There should be an independent review of existing delivery programmes, to assess the extent to which they meet the needs of the Heat in Building Strategy and Fuel Poverty Strategy.

Question 44 - Is there any action we can take to further tailor our support to meet the ambitions set out in this strategy, including in relation to fuel poverty? (Please include any evidence you may have to show what this might achieve.)

The number of respondents answering Question 44 is set out below, with 46 respondents, or 26% of all respondents, answering. Consumer Advice respondents were amongst those making extensive comments at this question.

Table 51

Question 44: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	2%
Community Council, Trust or Group	6	0	0%
Consultancy, Training, Assessment or Accreditation	13	4	9%
Consumer Advice, Advocacy or Campaigning	8	3	7%
Energy Generation, Supply or Distribution	20	7	15%
Housing Association	9	2	4%
Individual or Tenant Group	15	1	2%
Local Authority	23	14	30%
Product Manufacturer, Supplier or Installer	19	2	4%
Professional or Representative Body (Energy)	15	5	11%
Professional or Representative Body (Other)	21	2	4%
Public Body	7	2	4%
Third Sector or Non-Governmental Organisation	14	3	7%
Total	178	46	100%
% of all respondents commenting		26%	

Some respondents expressed support for the range of actions proposed and felt that these represented a comprehensive response to the ambitions set out in the draft Strategy. However, most of those providing comment suggested additional action(s) to tailor support to address the needs of specific groups, including those in or at risk of fuel poverty.

Further comments included that there should be more support for in-depth engagement with vulnerable households to facilitate the transition to decarbonised heat, including local third sector and other organisations working with communities and other stakeholders. This was highlighted as particularly significant in terms of driving the transition in remote rural and island communities. There was reference to Community Energy and Community Development Trusts as examples of this, with some calling for more research to gather learning and good practice, and to identify any gaps in current third sector work tackling fuel poverty. Pilot schemes were also suggested as a means of trialling this more intensive support approach, and there were also calls for the continuation or replacement of the RHI scheme.

Other suggestions included more engagement with local communities to ensure the right solutions are selected for each community's needs. This included support for the role of LHEES in identifying and responding to these needs. More work to increase awareness and understanding of energy efficiency measures and low/zero emissions heat was also proposed.

There were also calls for a greater focus on social landlords working with partners in the planning and delivery of high quality 'eco-homes' specifically for lower income households and those in or at risk of fuel poverty. Greater support for community housing schemes was also suggested to deliver homes with, or ready for, low/zero emissions heat, including suggested use of the Scottish Land Fund to purchase land for this purpose.

Suggestions relating to particular types of property or heating system included tailored approaches for:

- Flatted properties. This included development of regulation requiring owners to undertake regular surveys, establish building reserve funds, and form owners' associations – including potential for pilot schemes to trial this approach. There was also support for development of financial solutions which co-owners can use collectively to support deployment of low/zero emissions heating.
- Off-gas-grid buildings. In particular, the specific needs of those owning properties in remote rural and island communities that are reliant on costly electricity supply as the main form of heating. There were calls for a comprehensive Island Communities Impact Assessment. There was also support for development of a local electricity tariff making use of local energy generation to reduce costs, and for services to support households switching tariffs. Further suggestions included more support for oil-heated homes in off-gas-grid areas, with evidence cited on the relative cost benefits of conversion to renewable liquid fuel. This included calls for removal of fuel levies on renewable liquid fuels, and investment to stimulate demand and reduce the cost of these fuels.
- Properties with electric storage heating and hot water systems. There were calls for greater recognition of this group through the strategy, and support for smart-charging technologies to reduce costs for these households.
- Property owned by higher education institutions. This included reference to the complexity of decarbonising this sector, and their potential leadership role around demonstration and roll-out of innovative technologies.
- Properties owned by the public or commercial sectors. Addressing the gap left by closure of the non-domestic RHI scheme was highlighted, to support renewable heat systems in the public and commercial sectors that are ineligible for the Clean Heat Grant and Industrial Energy Transformation Scheme.

Other suggested actions also focused on ensuring the required technologies and supply chain are available. They included:

- Considering the establishment of a dedicated fund, in addition to the UK Government Clean Heat Grant, to support the technologies required to enable decarbonised heat.
- Establishing a database of costs for energy efficiency projects to inform future business cases and enable better tailoring of project design.

Chapter 7: Working Towards a Long Term Market Framework

The consultation paper notes the importance of an appropriate market framework that helps to create the demand for energy efficiency and low and zero emissions heating, helps consumers overcome the upfront investment costs and helps to attract and secure further private investment and finance to help meet the costs of the transition.

Question 45 - What are your views on the approach outlined above to take action towards a long-term market framework for net zero emissions in buildings?

The number of respondents answering Question 45 is set out below, with 73 respondents, or 41% of all respondents, answering. Consultancy and Professional Body (Other) respondents were amongst those making extensive comments at this question.

Table 52

Question 45: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	7	10%
Consumer Advice, Advocacy or Campaigning	8	3	4%
Energy Generation, Supply or Distribution	20	11	15%
Housing Association	9	5	7%
Individual or Tenant Group	15	4	5%
Local Authority	23	13	18%
Product Manufacturer, Supplier or Installer	19	10	14%
Professional or Representative Body (Energy)	15	5	7%
Professional or Representative Body (Other)	21	5	7%
Public Body	7	3	4%
Third Sector or Non-Governmental Organisation	14	5	7%
Total	178	73	100%
% of all respondents commenting		41%	

A number of the respondents, from across a range of respondent types, took the opportunity to express support for the overall approach and associated actions set out in the draft Strategy. This included reference to the value of a long-term policy

framework, targets, funding commitment and proposals for a regulatory framework. The significance of capital costs as a barrier to take-up of low carbon heat was also highlighted, with an effective market framework seen as necessary to substantially increase access to finance to meet the overall cost of decarbonisation.

There was also reference to the importance of public attitudes to decarbonised heat, and making low/zero emissions heat a positive choice. There was a perceived need for publicity campaigns running in parallel to development of the market framework, to improve public awareness of and support for decarbonised heat.

However, a small number of concerns were also raised, including that proposals are fragmented, and in relation to the timescales for developing a market framework and carrying out initial analysis and modelling work, and how achievable this will be in the context of ambitious government targets. It was noted that targets fall within the lifespan of heating systems being installed in 2021, and that rapid development of effective mechanisms is required to support deployment of low/zero emissions heat.

Analysis and modelling of costs

In terms of specific elements of the proposed approach, there was support for the commitment to analysis and modelling to understand the costs of upgrading different property types. It was suggested that understanding the cost challenge will be critical to developing the long-term market framework required to meet government targets, including reference to understanding cost implications for fuel poor households. However, there were also concerns about the potential for this work to delay introduction of the financial support required to facilitate the transition, with calls for analysis work to be expedited.

In terms of the focus of analysis and modelling work, respondents highlighted the need to reconcile the two policy objectives of fuel poverty alleviation and heat decarbonisation. It was suggested that the work should include:

- The relative economic costs and benefits of the full range of potential technologies to support the transition, such as solar PV, batteries (electric and/or heat) and smart controls that can be deployed alongside heat pumps.
- How the cost of heat pumps and other technologies could come down with economies of scale associated with government-led programmes.
- The relative costs of decarbonising heat in different property types and areas. In terms of property types, respondents referred to those with electric storage heating, and risks that the cost of meeting higher energy efficiency standards for social housing will impact the affordability of social rents, without additional public funding. Reference to geographic areas included higher costs for remote rural and island communities (in part due to transport costs for materials).
- Cost estimates for support to low and middle income households.
- How costs should be shared across consumers.

- The role and costs of technologies which were seen as having potential to avoid the need for significant capital investment for consumers, including hydrogen and decarbonised gas supply.

Green Heat Finance Taskforce

Respondents also expressed support for the commitment to explore new financial mechanisms and business models, noting the need to develop new ways of financing the investment required to achieve government targets. In this context, the proposed Green Heat Finance Taskforce was welcomed and seen as crucial in re-examining potential mechanisms to facilitate the transition. This was a frequently made point, with Local Authority, Energy Generation, Product Manufacturer and Professional Body (Energy) respondents amongst those commenting. It was suggested that the Scottish Government should ensure that future policy reflects Taskforce recommendations.

It was also suggested that the Taskforce membership should include cross-sector representation, including a consumer voice. In terms of the scope of the Taskforce's work, there was a call for the full range of potential approaches and mechanisms to be considered. This included support for the proposed continuation of interest-free loans via Home Energy Scotland.

There was support for green mortgages and linking the mortgage market with energy performance as a means of encouraging consumer choice. From a lender perspective, there was a call for any regime to be voluntary first rather than mandatory, and that the quality, coverage and frequency of EPC data would need to be substantially improved along with lender access to it in order to support the effective operation of the disclosures and targets regime. Respondents noted the potential for engagement with borrowers to promote low/zero emissions heat at key 'trigger points' such as purchase, re-mortgage and building improvement. There was support for piloting use of mortgage provider guarantees to finance measures to reduce emissions.

There was also support for proposals to explore use of powers over Council Tax and business rates, as part of a supportive tax regime - although some cautioned that Council Tax should be used as an incentive rather than a penalty. Council Tax and other tax-related options are returned to at Question 47.

The potential for mechanisms to support specific technologies, such as shared ground arrays, retrofit of electric storage heating, and hybrid systems was also noted. In this context, concerns were raised regarding the potential role of LHEES in mandating technologies to be used to support decarbonisation of heat in specific areas. While it was acknowledged that this could encourage investment in those technologies within specific areas, there were concerns that this could limit the case for development and investment in other technologies.

New business models

In addition to new financing mechanisms, respondents also saw a need for new business models in shifting public attitudes towards energy, and making low/zero emissions heat a positive choice.

This included support for the proposed public energy company as a means for driving development of a long-term market framework, and co-ordinating the transition to decarbonised heat. However, there were also calls for greater clarity around the role and function of the public energy company, including around its remit across public and private sectors. One view was that a public energy company could work with major energy suppliers in Scotland to facilitate Heat as a Service and take on other aspects of the transition, such as local authority capital programmes. However, there was also a call for the Scottish Government to re-consider the need for a public energy company, including reference to the demise of a number of not-for-profit energy suppliers.

Respondents also saw a role for Heat as a Service as part of a long-term market framework, overcoming capital cost as a barrier to the transition to decarbonised heat and improving consumer support for the transition. Views on Heat as a Service are considered in more detail at Question 47, but key points raised here included a perceived need for regulation and consumer protections to ensure the model remains affordable for consumers and suppliers, and whether obligations are transferred on change of building occupancy. Robust monitoring of outcomes was also suggested in relation to Heat as a Service and other models, including a view that previous 'green schemes' have failed to deliver the anticipated scale of impact.

Question 46 - What are your views on how we can achieve a fair and equitable cost distribution for the net zero transition, including ensuring we tackle fuel poverty?

The number of respondents answering Question 46 is set out below, with 67 respondents, or 38% of all respondents, answering. Public Body respondents were amongst those making extensive comments at this question.

Table 53

Question 46: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8		0%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	5	7%
Consumer Advice, Advocacy or Campaigning	8	4	6%
Energy Generation, Supply or Distribution	20	10	15%
Housing Association	9	5	7%
Individual or Tenant Group	15	5	7%
Local Authority	23	12	18%
Product Manufacturer, Supplier or Installer	19	10	15%
Professional or Representative Body (Energy)	15	4	6%
Professional or Representative Body (Other)	21	3	4%
Public Body	7	4	6%
Third Sector or Non-Governmental Organisation	14	4	6%
Total	178	67	100%
% of all respondents commenting		38%	

A number of the comments reflected issues covered at other questions, and at Question 18 in particular. They included broader themes relating to the importance of the Strategy weighing up social and economic factors, alongside net zero ambitions, and offering support to those who will struggle most to adapt to the transition in terms of fuel poverty. Reflecting themes covered under Chapters 2 and 5 in particular, there were also references to ensuring that any decisions around developing energy networks consider Scotland’s fuel poverty targets and not only the total cost of developing energy networks, but also who pays for them. Ensuring that these costs do not fall on those least able to pay was seen as an important part of Scotland’s Just Transition.

It was also suggested that there should be continuous engagement with communities to ensure that their voices are heard and that strategies align with people’s lives, particularly those who are living in fuel poverty.

Grant and other funding

For a number of respondents, capital grant funding for some households will be key to a fair and equitable cost distribution. These issues are explored further at the next question, but points raised included that any approach should be based on ability to pay and ability to adapt, and that grants to households in fuel poverty will be needed to enable the appropriate repairs and energy efficiency measures to

take place. A specific suggestion was that deep retrofit of housing stock in areas of deprivation will ensure long-term low fuel costs irrespective of heating type.

There was also reference to the potential of Heat as a Service type models or payment plans, although with reference to any loan-type products, it was suggested that higher overall costs must not result due to the cost of borrowing and that low- or no-cost borrowing must be made available to those without credit scores or with poor credit ratings.

In terms of specific groups that should be considered, there was reference to:

- Those who are 'nearly fuel poor' (i.e. who do not qualify for fuel poverty schemes but whose income level is such that energy costs are still a significant factor in household budgets).
- Tenants in the PRS, if landlords are unable or unwilling to invest in fabric and heating upgrades. Either splitting the risks and rewards between tenant and landlord (for example through green lease agreements), or appropriate regulation, were proposed. Another view was that passing on of reasonable costs to tenants must be expected and that this will increase the requirement for funding to support fuel poverty at the most vulnerable end of the market.

Supply costs

Other comments focused on supply costs, and in particular on the aligning of gas and electricity pricing being crucial to ensuring that the transition to electric heat does not exacerbate fuel poverty. This was a frequently raised theme and was highlighted by a range of respondent types. There was support for moving all decarbonisation related taxes and levies from electricity to general taxation and for introducing an emissions levy on gas.

However, there was also a view that moving levies currently on electricity to gas will increase the cost of gas and hit those in fuel poverty and on the lowest incomes the hardest. It was suggested that a rush to shift costs from electricity to gas could backfire and undermine public support for the transition to net zero.

The draft Strategy's recognition that there are difficult issues to consider in relation to how best to pivot from higher electricity costs to higher gas costs was noted. As at other questions, there was a call for the Scottish Government to engage as closely as possible with the Treasury and other concerned parties across the UK.

Other general points made in relation to supply included that there should be:

- Price caps on energy supply and maintenance costs and on standing charges.
- Close monitoring of the market and stringent consumer protection standards.

Measures for rural or island areas

Reflecting the theme around the disparity between gas and electricity costs, it was also reported that:

- There is a considerable gap in the cost of electricity between consumers in more urban areas and rural and island areas.

- The Building Level Investment does not reflect costs in some areas, with costs in Shetland given as an example.

There was a call for consideration of an island/rural uplift to help alleviate additional costs and challenges driven by logistics and the importance of ensuring that fuel and energy poverty does not continue at the hard to reach periphery was highlighted.

Question 47 - What financing mechanisms are needed to encourage investment from householders, businesses and the private sector?

The number of respondents answering Question 47 is set out below, with 86 respondents, or 48% of all respondents, answering. Consultancy, Consumer Advice, Product Manufacturer and Professional Body (Energy) respondents were amongst those making extensive comments at this question.

Table 54

Question 47: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	3	3%
Consultancy, Training, Assessment or Accreditation	13	7	8%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	9	10%
Housing Association	9	5	6%
Individual or Tenant Group	15	5	6%
Local Authority	23	14	16%
Product Manufacturer, Supplier or Installer	19	13	15%
Professional or Representative Body (Energy)	15	9	10%
Professional or Representative Body (Other)	21	11	13%
Public Body	7	1	1%
Third Sector or Non-Governmental Organisation	14	4	5%
Total	178	86	100%
% of all respondents commenting		48%	

Respondents sometimes referred back to their comments at previous questions, and at Question 42 in particular. Other comments addressed some of the broader themes already covered at Question 45, including support for the commitment to set up a Green Finance Taskforce. On a connected point, it was suggested that the Scottish Government should review the ongoing work of the Green Finance Institute, which works in collaboration with a range of stakeholders including finance

providers, in order to design new products that will be trialled in the marketplace. There was reference to the Green Finance Institute's demonstration projects and also to a European Climate Foundation funded project, delivered by Changeworks, that has identified business models for financing heat decarbonisation. However, it was also suggested that the Scottish Government should undertake more research with consumers to help understand what financial support and incentives they want and need.

There was broad support, from across a range of respondent types, for the consultation paper's proposition that a range of financing mechanisms should be considered, with further comments including that a blend of financial support, incentives and funding mechanisms tailored for different households, housing tenures and places across Scotland will be needed. In terms of the needs of different private households, and reflecting issues highlighted at Question 46, it was reported that many consumers who are not classified as fuel poor will not be able to take on loan repayments (even if they are interest free), put a down payment for a loan, or pay up front costs for zero emissions heating.

In terms of other general principles that should underpin any approach, comments included that:

- Applying should also be as easy and straightforward as possible, with a responsive application processes involving as little upfront time as possible.
- A degree of flexibility should be built in where possible, for example by making provision for an owner occupier to sell and move on.

Other comments focused on specific types of financing mechanism which are covered in turn below. Many of these comments appeared to be focused primarily on options for the private domestic market. Issues raised specifically in relation to the social rented sector, the public sector or the private business are covered in the later part of the analysis at this question.

Grant funding

A number of respondents, including Consultancy, Consumer Advice, Energy Generation, Local Authority, and Product Manufacturer respondents, referred to the importance of grant funding to cover capital costs and it was reported that up front grant payments have proved easy to understand and successful in the past, with the Clear Skies grant given as an example. It was suggested that the CHG scheme could be a good opportunity to support the upfront cost of a low/zero emissions heating system, if it is designed and promoted to households and SMEs in the right way.

In terms of the particular requirements or framing of any grant funding regime, suggestions included:

- There should be a commitment to provide grant support for those in fuel poverty.
- Grants for early adopters to pump prime the market.
- Match funding or the use of cashbacks could be considered.

- A 50:50 grant/loan fund for private homeowners to undertake energy efficiency and low/zero emissions heat work.
- A scaled grant system for able to pay householders could incentivise early adoption through covering all or most of the cost early in the transition while paying less of the cost as time goes on. For example, the grant could cover 80-90% of the cost prior to 2025, but only 10-15% in 2028.

Loan and mortgage products

There were also frequent references to low cost or interest free loans or to green mortgage products. Specific suggestions included:

- Interest-free loans that cover all of the cost.
- Low-interest loans which could be added to a green mortgage, and which could be applied for through the mortgage lender.
- Variable loan payback mechanisms as income changes (as with student loans).

Payment plan mechanisms were seen as having potential, including as a means to spread costs over time without the need for upfront capital. The options referred to included: on-bill financing; salary sacrifice; and dealer financing.

With specific reference to mortgages, it was noted that mortgage financing is a familiar way of borrowing over a longer term to make it easier to absorb the capital. There was interest in the consultation paper's reference to linking mortgages to energy performance, with the importance of transparency, and avoiding mistakes that have been made in the past, highlighted.

In terms of the wider mortgage market, comments included that:

- The existing mortgage market should be expanded to incentivise increased lending for retrofit and energy efficiency measures as well as reduced rates of interest for highly efficient properties.
- Energy reporting within mortgage markets should be compulsory – with built-in mechanisms to reward efficiency and drive improvement rather than accept the status quo.

A general point was that a financial product based on a building loan arrangement, that enables the loan to remain with the building owner in the event of a building ownership change, could be considered. A number of respondents referred to PACE schemes, with comments including that:

- It is a proven concept. In the US it is used for renewable energy installations in residential, commercial and industrial properties. PACE schemes have stimulated over \$5 billion in domestic retrofits in the USA.
- The approach would require legislative amendments. Such amendments have recently been enacted in Spain as part of a pilot project.

Heat as a Service

Heat as a Service was referred to as another model that has worked well in other contexts, and which warrants further exploration or consideration. Consumer Advice, Individual, Local Authority, Product Manufacturer and Professional Body (Energy) respondents were amongst those referencing Heat as a Service.

In particular, it was noted that the approach could:

- Be of particular value in the context of the (possible) higher installation costs that may come with some of the new and emerging technologies. This was connected to the potential of the model for non-fuel poor households who cannot afford the full cost of low/zero emissions heating system installation.
- Help allay fears around ongoing repairs and maintenance which households and businesses may have with new technologies.

It was reported that several companies are currently developing customer offerings which will combine heat and energy as a service, and the Scottish Government was urged to consult domestic energy suppliers in taking this type of approach forward.

It was suggested that more research or further consideration is required in relation to:

- The length of contracts. If this is a minimum of 10 years, what are the risks around payment and are customers allowed to switch between providers?
- Who would be liable for call out and repairs to a mix of old and new systems.
- Any complexities that could arise if a property is sold.

It was also suggested that the Scottish Government could learn from examples of best practice, such as the Energy Systems Catapult living lab, when conducting pilots.

Tax incentives

Some form of tax incentive were also seen as having a role to play, and there was a call to align the climate change goals and policies with the tax regime. Specific suggestions included:

- Council tax or business rates incentives.
- Land and Buildings Transaction Tax (LBTT) rebates or variation in rates. A system of variable LBTT rates by which would see house buyers receive a discount if a property is above a given energy efficiency standard, and an increased rate for properties that perform less well, was proposed.
- Reduction in rates of VAT, or removal of VAT. Further suggestions included reduced VAT on 'retrofit-led renovation' and removing all VAT on insulation.

In relation to VAT reductions, it was suggested that, if the UK Government does not adjust VAT rates, the Scottish Government could take action by establishing a VAT reimbursement fund to cover all general home improvement works (with some eligibility criteria) provided a certain EPC rating was achieved.

Social rented sector

The intention to extend the SHNZHF until 2026 was welcomed. However, it was also seen as important for the sector to have a clear sense of the financial support likely to be made available to social landlords. It was reported that housing associations' long-term financial plans will need to be overhauled and cost assumptions worked up to demonstrate that business plans remain viable. The connection was made to ensuring that landlords are not left in an exposed financial position, with possible impact on rent levels and, by extension, potentially undermining the goal of reducing fuel poverty and, more broadly, tackling child and family poverty.

One suggestion was that the use of governance guarantees to support RSL funding could transform the way the sector can look at retrofitting and building new homes. It was reported that the loss of European Investment Bank funding for the sector has been significant but that replicating the very low margins they worked to could be a step change in terms of the pace of delivery.

Businesses and the supply chain

There were also comments about the specific requirements of businesses. It was reported that current investment mechanisms to encourage the transition to greener resources involve more loan financing and further impacts on already negative balance sheets. Payback periods are important in relation to business plans, but do not allow carbon savings to be included, and it was suggested that the development of a model or mechanism that allows cost and carbon to be considered would be helpful.

It was also suggested that tax incentives for businesses implementing energy efficiency measures and/or renewable technologies could incentivise investment. Other suggestions included investment grants, either in full or match funded, that could be linked to other Government ambitions, such as agreements to implement fair work practices or the Living Wage.

Other comments addressed some of the financial and funding issues relating to the supply chain, a number of which have been covered at early questions, and at Question 3 in particular. Further points included that:

- Merchants also provide finance through credit accounts to plumbers and heating engineers who buy the products on behalf of the end users. As the cost of a heat pump installation is significantly higher than a gas boiler installation, the credit requirements that merchants will have to give to heating engineers will also have to increase. If merchants are unwilling to give heating engineers higher credit limits, then this could result in a funding bottleneck. If the government gave credit insurance on the sale of heat pumps, then this potential bottleneck would be removed.
- A stumbling block for new geothermal projects is the drilling risk. Other countries have mitigated this risk by underwriting the costs of 'failed' drilling. Scotland should consider introducing a similar scheme.

Other suggestions

Other comments or suggestions included:

- For those with the capital to invest upfront, mechanisms to facilitate collective purchase can reduce the cost of purchase and install. Many off-gas communities already bulk purchase heating oil, so this is a familiar concept.
- Over the past few years, crowdsourcing investment for community-based renewable energy projects has grown in popularity; there is potential to apply a similar model to community retrofit schemes.
- Mechanisms to facilitate community asset ownership could help reduce overall costs for consumers. Communal ownership models are likely to require upfront investment.
- Scrappage schemes, and particularly an oil tank scrappage scheme, could be considered.
- For local authorities, the Feed-in-Tariff and RHI presented positive funding programmes for renewables and low/zero emissions heat which focused on system outputs/performance.

Chapter 8: Developing a Regulatory Framework for Zero Emissions Buildings

Where it is within the Scottish Government’s legal competence, new regulations will be introduced to set standards for zero emissions heating and energy efficiency. Together, these regulations will cover the full range of Scotland’s domestic and non-domestic buildings and address both their energy efficiency and their direct emissions from heating. The consultation paper sets out the proposed approach for the introduction of these regulations, including reforming the assessment process and metrics underpinning Energy Performance Certificates.

Question 48 - What are your views on the regulatory actions set out in the proposed regulatory framework?

The number of respondents answering Question 48 is set out below, with 110 respondents, or 62% of all respondents, answering. Consumer Advice, Local Authority, Professional Body (Energy), Professional Body (Other), Product Manufacturer and Third Sector respondents were amongst those making extensive comments at this question.

Table 55

Question 48: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	4	4%
Community Council, Trust or Group	6	3	3%
Consultancy, Training, Assessment or Accreditation	13	7	6%
Consumer Advice, Advocacy or Campaigning	8	6	5%
Energy Generation, Supply or Distribution	20	11	10%
Housing Association	9	7	6%
Individual or Tenant Group	15	2	2%
Local Authority	23	16	15%
Product Manufacturer, Supplier or Installer	19	14	13%
Professional or Representative Body (Energy)	15	9	8%
Professional or Representative Body (Other)	21	17	15%
Public Body	7	7	6%
Third Sector or Non-Governmental Organisation	14	7	6%
Total	178	110	100%
% of all respondents commenting		62%	

General approach

A number of respondents, from across a broad range of respondent types, made a general statement of support for the regulatory actions set out in the proposed regulatory framework. It was described as proportionate, comprehensive and easy to follow. They were also described as ambitious, as setting out an ambitious timeline or as standing Scotland in good stead for making progress with the decarbonisation of heat.

Regulations were described as one of the greatest policy levers available for achieving significant market changes, but it was suggested that the current regulatory framework, in tandem with the financial incentives available, has not helped sustain growth. Another perspective was that regulation should be a backstop and the mechanisms to support participation must be key.

Aspects of the proposed approach which were welcomed particularly included that it:

- Integrates energy efficiency and heat supply in regulations.
- Addresses new and existing and domestic and non-domestic buildings.
- Considers the health and wellbeing of Scotland's people, and will be aligned with the Fuel Poverty Strategy.
- Should help to provide certainty and develop supply chain confidence.

However, it was also noted that the consultation paper refers to ensuring actions have no detrimental impact on fuel poverty. It was suggested that rather than having no detrimental impact, the focus should be on having a positive impact.

A further concern was that it is not reasonable to regulate when there is no clear, scalable, and fundable set of technical solutions in place. A number of the concerns raised were focused on the extent to which householders and businesses will be able to cover the costs of the requirements set out. It was suggested that more clarity will be needed in relation to the financial support to be made available.

Framework development

There was support for the commitment of the Scottish Government to work closely with the UK Government on the regulatory framework and to argue for local delivery methods.

Other comments also addressed the further development of the framework and included that the design will require careful consideration and a holistic approach; it would be particularly valuable to review and take account of lessons from mechanisms which have been used in the past and ensure that a whole-of-sector approach is taken in order to minimise the risk of unintended consequences. There was also reference to the quality assurance approaches used in other sectors, such as social care, and a suggestion that these could be drawn on in relation to considering impact on those most affected and in relation to gathering good practice.

It was noted that significant time has been set aside for consulting and for legislation to come forward. Whilst the intent to allow sufficient periods of transition

to allow people and the market to adjust and prepare was understood, there was nevertheless a concern the time set aside is too long if we want to meet the 2030 decarbonisation target. A more frequently raised issue was that, given the ambitious 2030 targets, the approach to regulation should be developed and approved as quickly as possible. This included to enable time to plan and, specifically, for the supply chain to ramp up to meet the growing demand. It was also suggested that compliance will take time; social and private landlords and homeowners will need clear communication about timescales for changes and how they can meet any new statutory requirements.

However, there was also a view that a well-designed regulatory framework may be more important than the achievement of the 2030 target, and there was an associated concern that urgency may compromise good policymaking and could undermine levels of acceptance, including among the general public.

In relation to the review and revision of the framework itself, suggestions include that once PAS 2035/30 is adopted in the Government's delivery programmes, a review should be carried out to gather lessons and review the possibility of incorporating PAS, or key lessons and elements of it, within regulations.

Enforcement

It was suggested that those charged with ensuring compliance with or enforcement of the framework will need to be sufficiently resourced. There were concerns about capacity, skills and resource levels within local authorities, especially if some of the changes could have very significant resource implications for local authorities. The impact on warrant submissions was cited as one example of when this would be the case.

New build and New Build Heat Standard

A number of comments addressed the proposals for new builds, and the New Build Heat Standard in particular. Some respondents noted their support for the proposals for Scotland's New Build Heat Standard, with further comments including that such measures should be implemented in the shortest possible timeframe.

Some queries or concerns were also raised. These included that:

- There is reference to new buildings 'consented from 2024' and allowing construction after 2024 on consents given before 2024 could result in many new buildings that are not in line with the New Build Heat Standard. One suggestion was that the 2024 date should be for hand over to the new owner.
- The proposed standard would apparently count the restoration of a building as a new building – but would not give any credit for the embodied carbon in that building or recognise that its environmental performance would be different from a completely new building. The regulations should reflect the embodied carbon in such structures, and the benefits of putting buildings back into use, rather than demolition and replacement with a new build.
- Not allowing any offsetting will restrict the use of technologies which could be more suitable for larger buildings or in remote or island communities.

Developing a Regulatory Framework for Zero Emissions Buildings

It was also suggested that standards relating to building fabric are also critical and that the New Build Heat Standard must be accompanied by with a building fabric that performs as specified on the EPC. In particular, it was reported that industry would welcome early clarity on the options for future fabric standards for new builds, to avoid the risk that the building sector is unprepared, and ultimately unable, to meet them. There was reference to the UK Government's accelerated deployment of the Future Homes Standard and there was a call for the Scottish Government to follow a similar trajectory.

Existing homes

General comments relating to existing homes included that it is imperative that regulation is harnessed as a tool to steer consumers away from carbon intensive heat. It was reported, for example, that there are a large number of gas dependent consumers in Scotland who need to be persuaded to decarbonise their heat. The introduction of regulatory mandates and backstops was seen as a way of influencing consumer choice and behaviour.

There was a call for more clarity on what requiring installation of zero or very near zero emissions heating systems in existing buildings from 2025 means in practice. It was suggested that:

- Definitive targets with primary energy targets are needed.
- The Scottish Government needs to give absolute clarity on which technologies can and cannot be installed by what date.

The challenges faced in some rural areas were highlighted, including around low incomes, dispersed buildings, barriers to achieving economies of scale and reduced technical expertise in the construction sector. Whilst agreeing with setting out a clear pathway to achieving zero carbon, it was suggested that the local authorities in these areas need the necessary capital and revenue funding to deliver energy efficiency improvements and to support local people.

There was also a call for recognition that not all homes will be able to achieve the highest targets of energy efficiency, particularly traditional and heritage buildings. It was suggested that there needs to be a method of certifying these buildings meeting an acceptable standard to protect the homeowners from action.

Other comments linked any requirements for existing homes with the need to reform the EPC assessment process, as discussed further below. There was a suggestion that any requirements should be delayed until a new assessment approach is in place.

Domestic EPC reform

EPC reform was the most frequently raised issue at this question, was referenced by a broad range of respondent types, and was also a recurring theme that was raised at a number of other questions. A number of respondents provided detailed and technical comments (both in relation to issues with the current approach and possible options for reform). These comments are available to the Scottish Government policy team responsible for EPC reform.

Developing a Regulatory Framework for Zero Emissions Buildings

Some respondents, from across a broad range of respondent types, agreed that the domestic EPC system needs to be reformed or welcomed the Scottish Government's commitment to consult on a reformed domestic EPC assessment process. It was sometimes suggested that any use of EPCs in relation to regulatory targets should be subject to improvements having been made.

Getting EPCs right was described as fundamental to enabling Scottish consumers to take the right decisions on their energy consumption to deliver on net zero targets. In terms of other positive outcomes that respondents expected or hoped would stem from EPC reform, there was reference to:

- Making EPCs more consumer friendly.
- Helping to reduce the negative impacts of fuel poverty.

There was support for the Scottish Government's proposal to introduce an indicator for heating emissions which will recommend to building owners the most appropriate form(s) of heating system to reduce emissions to zero, as appropriate to their building type and fabric, and taking account of wider changes to heat supply in the area. The plan to look at the use of EPCs for mixed-tenure and mixed-use buildings was also welcomed.

Specific issues to be addressed or included

The Standard Assessment Procedure: A number of respondents referred to the SAP calculation. There was a concern that, without modifications to the SAP, there is a risk that the focus will be primarily on energy efficiency, and it was suggested that the model must account for the carbon savings of new technologies. Concerns about the utilisation of the 'notional building' method, under-estimation of the space heating demand, and the exclusion of an assessment of unregulated energy use were also raised.

It was suggested that SAP could better encourage demand management. Other suggestions included considering the use of an Energy Use Intensity metric.

With specific reference to historic or traditional buildings, it was reported that the current SAP methodology fails to adequately distinguish between different building fabrics and types, with the energy performance of traditional buildings and building materials often estimated as being worse than their actual, real-world performance. It was also argued that recommended measures can be inappropriate, damaging, carbon-intensive and costly. As part of reforming the SAP to give more accurate EPC ratings, as well as more appropriate recommendations for energy efficiency measures for traditional buildings, it was suggested assessors should be trained in traditional building fabrics and what products are appropriate for traditional buildings.

Actual in-use performance: This was described as crucial element missing in the proposed regulatory framework. A proposed solution was a combination of regulatory instruments, such as operational ratings alongside EPCs and the extension of Building Standards requirements beyond practical completion. It was suggested that this would help deliver actual performance improvements, rather than theoretical asset ones.

Assessment of the efficiency of the heating system: This should include its readiness for low/zero emissions heating. It was suggested that this may not only provide a relatively low-cost intervention that homeowners could take to make their property low carbon ready, but it will also provide immediate benefits if implemented on an existing fossil fuel system and will also ensure that hydrogen boilers will be running at their most efficient if and when introduced.

Links to LHEES low/zero emissions heat planning: The potential for linking EPC assessment methodologies with the methodology used in LHEES for low/zero emissions heating planning was also highlighted. It was reported that EPC and SAP methodologies do not consider the available low/zero emissions heating options beyond household-level technologies and miss opportunities to recommend connection to a nearby heat network or hydrogen supply.

Installation of low carbon heat pumps: It was seen as a significant anomaly that EPC ratings do not recognise or recommend the installation of heat pumps. It was suggested that an effective EPC measure will create a pipeline of demand for the heat pump sector from social and private landlords and, in time, owner occupiers.

Recommendations for off-grid properties: The concern was that EPCs are currently more likely to encourage off-grid property owners to take up higher emissions heating solutions rather than invest in energy efficiency measures. This was connected to a concern that the EPC places a disproportionate focus on the cost of the input fuel, driving off-grid homes away from low/zero emissions technologies and onto higher carbon, currently cheaper energy sources to gain a higher EPC rating.

Other elements: Other elements which respondents hoped to see covered by EPCs included:

- Post-works heating costs compared with pre-works costs.
- A consideration of local climate (temperature and wind).
- Recommendations displayed in a fabric first hierarchy to ensure that homeowners understand the importance in minimising demand alongside upgrades to heating systems.

Context for the reform of EPCs

The work of X-Tendo and similar schemes such as the Australian National Australian Built Environment Rating System were cited as good examples to inform the review.

In terms of taking the review forward, the Scottish Government was urged to work closely with the UK Government to co-ordinate improvements to EPCs. There was a concern that any significant divergence in approach between Scotland, England and Wales could compound the complexity and risk for energy suppliers in delivering the ECO.

Delivery of EPCs

Finally, it was suggested that proposed changes to the EPC or SAP will not address underlying issues with the implementation of EPCs 'on the ground'. There was reference to known challenges in achieving consistency with EPC assessments and it was suggested that the Scottish Government needs to have a much stronger enforcement mechanism alongside any reform of EPCs with parallel reform of the training and accreditation process.

Additional or complementary approaches

There were also suggestions for approaches which could run alongside or complement the EPC assessment approach, including the use of performance-based metrics through other forms of measurement. Specific suggestions included:

- Business renovation passports which could be designed from the outset to provide bespoke recommendations for a property. It was suggested that these could be live and dynamic, with homeowners able to change various aspects of the passport as and when they upgrade the home.
- Reports for occupants and homeowners via the PAS 2035 process. It was suggested that these would boost information balance and accuracy.

All tenure zero emissions heat standard

There was support for the introduction of an All Tenure Zero Emissions Heat Standard, including because it will provide a definitive end date for ending fossil fuels in homes.

It was noted that this approach reflects the commitment in the Housing to 2040 Strategy to introduce a common housing standard for all tenures. Whilst it was recognised that varying needs and existing legislation will mean different sectors will require different regulatory frameworks, it was suggested that standards should be aligned. It was hoped that an aligned approach would help ensure compliance and would offer clarity for consumers.

In terms of coverage of an all tenure standard, there was a call for holiday lets, Airbnb, and tourist accommodation be included in the regulatory regime to ensure the entire building stock will reach zero emissions, and to avoid any unintended consequences of properties changing use to avoid regulation.

However, others raised concerns about the proposed approach. The intention to consult on the Standard in 2022 was noted, and caution was urged. Specific concerns sometimes related to the tenure-specific minimum standard target dates or backstop dates, or the feasibility or desirability of the targets or trigger points. They were sometimes connected to the issues around barriers to deployment and the approach to different fuel types and heating systems raised at other questions (and at Questions 2 and 3 in particular). A general point was that the Scottish Government should adopt a flexible approach to how it enforces standards, seeking to actively encourage and incentivise investments, rather than deter them.

There were also concerns about the references to technical feasibility and cost-effectiveness (relating to the owner occupied and PRS and to mixed tenure

buildings). It was suggested that there is a danger that the qualifying statement to set energy efficiency levels to EPC band C “*where it is technically feasible and cost-effective to do so*” is open to mis-interpretation and mis-use. It was said to raise a number of regulatory issues, including around the qualifications of those making the assessment and what is considered to be cost-effective. It was also suggested that the definition of cost effective needs to be fully developed and should include externalities related to climate change. There was an associated view that Ofgem will struggle with this unless provided with specific and clear instruction on these matters.

Tenure or property type specific

Private Rented Housing Minimum Energy Efficiency Standard: Comments included that 2028 is not a realistic timescale for the PRS to meet EPC band C. Specifically, it was suggested that this target will be unfeasible for many traditionally constructed and historic lets.

There were concerns that the regulations could result in many private landlords opting to pull out of private renting as standards become more onerous. There was also a concern that, if market mechanisms are not introduced until 2025, private landlords will only have three years to meet the standard, which could overwhelm the local authorities who will be expected to provide enforcement.

However, it was also noted that the PRS is the least efficient housing sector, and that this does create a sense of urgency.

Alternatives proposed included: an intermediate target of EPC band D for the PRS; a requirement for EPC band C by 2030; and that the PRS and owner occupied sector targets should be aligned, ensuring properties that move between the two do not fall through gaps in enforcement.

With specific reference to historic or traditional properties, there was a call for additional support and funding, perhaps in the form of a voucher or cashback scheme which targets rural homes. It was also suggested that the cost-effectiveness threshold could be set at a lower rate for these homes.

Owner-occupied Minimum Energy Efficiency Standard: There was support for the Scottish Government’s intention to consult on a Standard for the owner occupied sector, although it was noted that commitments to introduce minimum energy efficiency standards for owners have been around for a long time but have so far not materialised. It was suggested that there is inevitably going to be some doubt over whether and how this existing commitment could be further extended to cover the installation of zero emissions heating systems.

In terms of further views on the proposal to introduce regulations from 2023-2025 and that all properties should meet the Standard by 2035, views included that the date should be brought forward to EPC band C by 2030.

A number of queries were also raised, with further information or clarification sought in relation to:

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- How the Scottish Government intends to engage with owner occupiers as these regulations are introduced.
- The financial assistance that will be available, especially given the prevalence of fuel poverty amongst households that are either owned outright or with a mortgage.
- The approach to owner-occupied homes that do not hit 'trigger points' before 2045.
- Whether regulations would be enforced through conveyancing.

There were concerns that, if the government is required to legislate for these changes after consultation next year, it could only leave a short period of time to prepare the market and supply chain. It was also suggested that there are complex issues associated with compelling homeowners to take action, particularly where they may not have the financial resources. A support framework to engage with homeowners and work through the options that may be available to them was seen as essential.

Respondents identified possible unintended consequences that could stem from the proposed approach, including:

- Trapping people in their homes as they could be unable to sell them.
- Buildings becoming stranded assets if owners find it difficult to upgrade buildings in line with proposed timescales.
- Properties that cannot be improved in a technically feasible and cost effective way being devalued. Devaluing properties as an outcome of regulation could result in negative equity scenarios for some homeowners.

It was also argued that wholesale devaluation of properties or property archetypes which are less able to be improved cost-effectively will impact on mortgage lenders and could trigger a need for greater capital allocation if these properties are deemed riskier as a result of non-compliance. In turn this could make mortgage lending on them more costly resulting in market distortions and the emergence of a two-tier market.

Social Housing Minimum Efficiency Standard: Specific comments were limited but included that a number of the targets set out do not align to EESSH2. There was support for the proposal to bring forward the review of EESSH2 to 2023, but also a concern that, from a local government housing perspective, any plans to bring EESSH2 timescales forward to 2023 would be very challenging. A Local Authority respondent reported that in 2021/22 they will be focused on assessing stock and investment options as to how to achieve EESSH2, leaving only one year of investment to assess progress.

Mixed-tenure and mixed-use buildings: There was support for taking a specific, whole-building approach, for mixed tenure buildings and the Scottish Government's intention to consult on a suitable regulatory approach was welcomed. The consultation's recognition that it will be important for EPCs to recommend the necessary communal works to retrofit the whole building was also welcomed.

However, some possible challenges were also identified including:

- For mixed tenure buildings that include social rented sector homes, there was a concern that any approach will be very difficult if private landlords do not receive any funding or owner occupiers refuse to participate. It will have a significant impact on the social housing stock if these properties cannot be brought up to standard without the co-operation of others. This was seen as highlighting the tension between the current aspirational target for social landlords through EESSH2 compared to the approach for the private sector.
- If regulations are also to include improvement to communal areas or consider heat networks as part of LHEES, then affordability will be a big test to overcome. The complexity around mixed tenure buildings will also add to the difficulty in funding and implementing communal retrofit measures.

Although recognising the potential complexities, it was suggested that the proposed backstop of 2040-45 for mixed use/tenure buildings is too late. There was a concern that setting a later deadline seems unlikely to help of itself, especially when more fundamental barriers exist to addressing disrepair and lack of energy efficiency in common blocks (including blocks which are fully private). With mixed tenure flats and tenements representing a considerable proportion of Scotland's housing stock, there was a call for further action to ensure these households are included in the transition.

Proposals included further action to investigate how mixed tenure households can be brought in line with the 2035 or earlier target date, and that the 2045 backstop should be reserved for only the most complex buildings and determined on a case-by-case basis. Other suggestions included that there should be:

- Radical, new approaches to addressing disrepair in mixed tenure and private blocks.
- Bespoke strands of energy efficiency delivery work targeting communal properties, independent of the discussion on standards.
- Introduction of powers for Government to compel action in locations where there are common areas and a lack of agreement. The facilitation of common works on behalf of the reluctant parties through the Government taking their share of those works and levying that as a charge against the property would enable progress.

Not all respondents agreed with there being a specific regulatory approach for mixed tenure buildings. Having separate targets was described as confusing and it was suggested that mixed tenure buildings should be included in sector targets, but that additional advice and financial incentives should be offered to occupants of multi-occupancy buildings who are willing to adopt a fabric first, whole building approach that includes communal areas. Another view was that there should be a specific mixed-tenure approach but that the same 2030 date should ideally apply.

Historic Buildings: Comments tended to reflect the issues about specific provisions and exemptions for traditional, listed or historic buildings or properties in conservation areas covered at Questions 2 and 3 in particular. The commitment to work with Historic Environment Scotland was welcomed.

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It was reported that in England, listed buildings, buildings in conservation areas, monuments, locally listed buildings, buildings in national parks and traditionally constructed buildings are exempt from the requirement to comply with energy efficiency legislation where it is judged that 'compliance would unacceptably alter their character and appearance.' There was a call for Scotland to consider a similar approach.

Another perspective was that the Scottish Government should be cautious as to the detail of any exemptions. This was connected to previous experience of the application of blanket carve outs and the complexity that nested regulations can create. There was a call to recognise the importance of localised regulations to deal with local contexts.

Existing non-domestic buildings: Although there was support for the proposal to introduce regulations in 2023-25, with backstops between 2035-45, there was a concern that the main emphasis is on energy improvement targets to reduce demand for heat. There was a call for actions on carbon reduction be included - for example, through encouraging city centre buildings to be joined to a heat network when it becomes available.

Public Sector buildings: There was support for the focus on immediate action for public sector buildings, including because they will be important anchor loads for heat networks and they will be key leaders if we are to see successful schemes in the next few years. Other comments or suggestions were that:

- The timescale for the phase out of unsustainable fossil fuelled public sector heating is unstated and should be set.
- Examples of public sector buildings providing anchor loads for heat networks could be used as exemplar pathfinder projects.
- More information and clarity around activity in the public sector in the short term, for example from 2022–2024, would be helpful in building private sector investment interest.

Trigger points and area-based regulation

Trigger points

Those who commented tended to agree that the use of trigger points should be considered, particularly given the challenges associated with regulating for owner occupied homes. It was also reported that it can be difficult to encourage energy efficiency in the able to pay sector.

In terms of the advantages and strengths of this approach, general comments included that focusing on points when change is already occurring should minimise disruption to building occupiers and can also be cost effective.

With reference to specific trigger points, it was noted that sellers often make upgrades to their home to try and receive the greatest interest from buyers and that new homeowners moving into an empty building are often eager to renovate to put their own stamp on the property. With the majority of buyers requiring a mortgage, it was also suggested that the purchase of a property may be an easier time to

absorb the costs of efficiency upgrades and/or heating system replacements through additional borrowing.

However, others raised queries or concerns about the use of trigger points. These included that it is not clear whether there would be financial support to assist building owners with carrying out the required actions. In relation to a 'back stop', there was a query as to what will happen if no trigger point is reached before the 2035 (or other target deadline). A suggestion was that a mandatory 'back stop' should apply if no trigger point occurs within a set period.

There was also a view that, while the use of trigger points could be advantageous in certain circumstances, such as retrofit in owner occupied homes, there may be other circumstances to which the approach would not be well suited. The example given was heat pump deployment, where location and building compatibility are key factors, and where wider grid capacity constraints could apply.

The broader point was that specific trigger points may be appropriate or inappropriate for specific measures and sectors, and consideration should be given to this in their application. For example, trigger points could be used where location and building suitability are not key factors that would require a targeted approach.

Specific trigger points

Comments or concerns about using change of tenancy as a trigger point included:

- Long term tenancies would mean there was no requirement to bring properties up to standard.
- Change of tenancy is an administratively difficult trigger point for local authorities, as there is no natural point of contact between local authorities, landlords and tenants at change of tenancy. The administrative burden, especially in areas with high rates of turnover could cause low levels of enforcement.

It was proposed that the landlord registration system would offer a better way forward and that integrating EPCs into the landlord registration database would have an additional benefit of filling existing gaps in data. Specific suggestions included that either initial landlord registration, or the 3 yearly re-registration of the landlord, could provide a trigger point.

Comments about other trigger points were that:

- Either 'replacement' should be removed from the 'Replacement or installation of a new heating system' trigger point or boiler replacements should be excluded from the definition. It was suggested that requiring installation of net zero heating systems when a heating system breaks down and needs to be replaced would be inhumane and politically unpopular.
- It is critical that heating which is appropriate to the fabric and energy use of the property is in place at point of sale. A point-of-sale trigger could create a significant risk for those purchasing a property if a net zero heat source is installed when not appropriate in order to get the property 'over the line'. A

similar concern was raised about requiring changes to heating systems at a change of tenancy (as discussed further above).

Area-based approach

There was also support for an area-based approach. In terms of the strengths of this approach it was suggested that it would:

- Accommodate circumstances where there are shared or common issues across an area, such as common construction type, mixed tenure ownership or where area-based heat solutions such as heat or hydrogen networks are particularly suitable.
- Be easier from the homeowner's perspective.
- Offer a relatively cost-effective solution.
- Allow electricity network planning to take place alongside the changes in heating.

It was also suggested that area-based regulation could align well with the strategic approaches that are being considered through LHEES. It could support a targeted approach based on building needs and the suitability of measures and would enable strategic co-ordination with key enabling stakeholders like utility network operators and heat network operators and developers. Area-based regulation could also allow some control over the rates of installs that could potentially complement baseload uptake from the application of trigger points. This could help ensure that deployment rates are aligned with overarching decarbonisation targets.

However, there were also concerns about an area-based approach including that it could be complex and may be difficult for consumers to understand and navigate. There were concerns about different requirements applying to similar properties based only on their location. There were also concerns that the construction types of buildings in an area, for example where there are steel frame or no-fines concrete properties, may limit the scope to upgrade.

An alternative proposal was that, as part of LHEES, local authorities could support owner occupiers or private landlords within their council area or specific zones to 'buy into' large works in their area, co-ordinated by a PAS 2035 installer. This would encourage economies of scale while relieving pressure on owner occupiers or landlords who may not otherwise know where or how to start making upgrades to their properties.

Question 49 - What are your views on the timeframes set out for the application of the regulation set out above?

The number of respondents answering Question 49 is set out below, with 80 respondents, or 45% of all respondents, answering.

Table 56

Question 49: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	7	9%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	8	10%
Housing Association	9	5	6%
Individual or Tenant Group	15	2	3%
Local Authority	23	13	16%
Product Manufacturer, Supplier or Installer	19	12	15%
Professional or Representative Body (Energy)	15	8	10%
Professional or Representative Body (Other)	21	8	10%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	6	8%
Total	178	80	100%
% of all respondents commenting		45%	

A number of respondents, from across a range of respondent types, noted their broad agreement with the timeframes set out, albeit some of these respondents suggested changes to one or more of the timescales suggested. Reasons given for supporting the general approach included that setting clear timeframes will provide certainty to the market that the transition to low/zero emissions heat is inevitable and that the target of EPC band C by 2028 aligns with the UK Government's proposals.

The timeframes were described as ambitious but achievable if barriers to participation are addressed and/or other considerations are taken forward, for example the revision of the EPC assessment process. Others also cautioned that the scale of the practical measures required to achieve the targets should not be under-estimated or there is a high risk of the targets not being met. As at other questions, there was reference to:

- The supply chain and that capability and capacity will need to be in place across all key functions. It was suggested that clear timeframes will deliver a strong signal to investors and manufacturers to scale up investment and production and incentivise installers to upskill to be able to install new methods of heating.
- The importance of interim targets in driving the deployment of low/zero emissions heat.

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- The need for transitional arrangements for certain sectors that are high volume users of hot water (hospitals, hotels and leisure providers) or for building types where heat pumps are not suitable for heating, such as high bay warehousing. These building types need special arrangements/different timelines.
- The impact on local authorities and particularly around workload just prior to implementation. It was noted that this will apply to their regulatory and enforcement role, but that some local authorities will also be involved as social rented sector landlords.

It was also noted that time does need to be included for adequate consultation and sign-off to final regulations, and to ensure supporting policies and programmes are ready to go alongside the introduction of regulation. It was also suggested that, while the lead times seem achievable, the time required will depend on how complex the technical proposals are and if compliance is 'certification' led or requires interventions from the local authority's Building Standards team.

The importance of setting out the full details of the proposed regulatory changes as soon as possible was also highlighted. The Scottish Government's proposal to consult on a proposed standard and any legislation needed to underpin this during 2022 was welcomed, although others were concerned about the intended timeline for developing the regulatory framework and the introduction of legislation. They included Consumer Advice, Public Body and Third Sector respondents. There were calls to move more quickly by:

- Consulting on mandatory standards in late 2021.
- Introducing regulations in 2022.
- Implementation from 2025.

Others, from across a range of respondent types, also suggested that the timeframes for compliance are not challenging enough. There was a concern that if the difficult decisions to impose regulation in order to trigger action are not taken, targets will be harder to achieve. Although recognising the importance of having the right measures and programmes in place, it was suggested that the response to the pandemic has demonstrated the potential of rapid policy making. Specific comments included that there is potential for further ambition with regard to certain stock types or with the final compliance date of 2045.

Another perspective was that although the timeframes may be appropriate, they should be seen as the latest possible date by which these targets should be met, rather than the dates by which it will be possible. Early action in some tenures could allow targets to be met earlier than anticipated, and this should be borne in mind when developing incentivisation policies.

Others were concerned that the proposed timeframes are impractical, or overly ambitious, unless supported by extensive investment. This included because the time may be too short for the best technical solutions to be ready to be rolled out.

Returning to the issue of capacity and skills, it was suggested that the timeframes proposed do not allow enough time to train new skilled contractors. There was also

a view that the effect of the COVID-19 pandemic may mean the timeframes set out are no longer realistic.

Specific timeframes

Further comments often reflected the type or tenure-specific issues covered at Question 48. Additional points are set out below.

New build: Those who commented thought that the timeframes for new build homes should be reduced. They included Product Manufacturer, Public Body and Third Sector respondents. The delay in implementing zero emissions heating regulations for new buildings until 2024 was seen as a missed opportunity. Alternative suggestions included: all new buildings currently going through planning should be required to install low/zero emissions heating now; the requirement to meet Passivhaus equivalent standards immediately; or that plans to future-proof new buildings with low/zero emissions heating options should be implemented in as short a timeframe as possible.

Existing homes: Respondents also tended to suggest that the existing homes timeframes, and particularly the backstop date, should be brought forward.

However, an alternative view was that the proposed backstop date of 2045 lacks ambition or is far too late. Given the average lifespan of a heating system is 15 years, it was suggested that meeting the 2045 net zero target will require the Government to ensure that all heating replacements are low/zero emissions from 2030 (at the latest) onwards.

However, the proposal to set earlier back stops for 'low regrets' areas where a strategic technology is almost certainly the solution was welcomed and there was a call for targets in the 2020s for high direct emissions options like oil and LPG.

Another suggestion was that energy efficiency and zero emissions heat targets for existing buildings should be brought forward to 2030, although it was suggested that this would require support for homeowners, landlords, and contractors carrying out the work to make this realistic.

Other comments referred directly to gas boilers and included that allowing installations up to 2045 could mean that a large proportion of gas boilers are still in operation in 2060. It was suggested that, at a minimum, phase out target dates for replacement boilers should be from 2025 for off-gas grid properties and from 2030 at the latest for on-gas grid properties. A similar suggestion was a 2030 phase out date for on-gas grid homes with an EPC band C rating or above, to ensure that the most energy efficient and effectively 'heat pump ready' homes make the switch within this decade.

An alternative view was that 2025 would be far too soon to limit gas boilers in existing buildings, if this is the policy intent.

Question 50 - What are your views on how our Delivery Programmes could support compliance with regulation?

The number of respondents answering Question 50 is set out below, with 60 respondents, or 34% of all respondents, answering. Public Body respondents were amongst those making extensive comments at this question.

Table 57

Question 50: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	2%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	6	10%
Consumer Advice, Advocacy or Campaigning	8	6	10%
Energy Generation, Supply or Distribution	20	5	8%
Housing Association	9	4	7%
Individual or Tenant Group	15	1	2%
Local Authority	23	12	20%
Product Manufacturer, Supplier or Installer	19	6	10%
Professional or Representative Body (Energy)	15	3	5%
Professional or Representative Body (Other)	21	9	15%
Public Body	7	5	8%
Third Sector or Non-Governmental Organisation	14	1	2%
Total	178	60	100%
% of all respondents commenting		34%	

A number of respondents commented on the importance of delivery programmes in achieving compliance, including through aligning those programmes with the regulatory regime and by programmes having a strong focus on supporting businesses and households to meet the new regulations. It was reported that the approach to digital investment has been encouraged by activities to actively remove barriers to investment, working in partnership with network operators and regulators, and could be a model to consider for heat.

Integrated planning and coordination were described as critical to success and, to this end, it was suggested that:

- Capital funding that is allocated over a longer term than the Scottish Government's current annual cycle would allow for effective programme planning of works and the delivery of measures spanning multiple financial years.

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- Government should commit to future regulation, and delivery programmes should then adopt those standards ahead of regulation. This approach would help support investment and the development of relevant skills and products. It would also help ensure that building owners are aware of and can access programmes as soon as possible.
- Quick and timely communication to the market of how initiatives are tracking will be important.
- It will also be important to ensure that programmes can meet demand, including in the period around a regulatory milestone, as many will wait until the last available opportunity to make the transition.

It was also noted that the regulatory targets are tenure specific, whereas many of the delivery programmes are cross tenure. It was suggested that there will be a requirement to co-ordinate the delivery programmes to ensure that all tenures are on track with their respective targets.

Providing advice and awareness raising: Delivery programmes were said to have a key and ongoing role in offering expert and holistic advice to consumers, as well as facilitating financial support, and it was reported that there are already referral mechanisms between delivery programmes and advice agencies, leading to positive outcomes for vulnerable consumers. The role of delivery programmes in engaging businesses on regulations was also highlighted.

In terms of the regulation, it was suggested that programmes could be a route through which people can find out more about why regulation is being introduced, the regulation that applies to their property and the associated timescales, and both the energy efficiency and heating options available and the benefits associated with these. One suggestion was that delivery programmes could have an additional check on vulnerable groups and their understanding of what decarbonisation means for them, and what regulation expects from them.

However, there was also a concern that a role in increasing consumer awareness seems to be an ongoing omission from the delivery programmes.

Providing (more) financial support: For a number of respondents the continuing or increased provision of financial help will be key to supporting property owners to comply with regulations. It was suggested that financial incentives will be a strong lever and that one of the fundamental challenges which delivery programmes will need to address is how to make private homeowners act sooner.

Specific suggestions included:

- Providing funding for energy efficiency measures as well as heating system installations.
- Providing support for businesses that need to retrofit their premises, perhaps through interest free loans.
- Investigating an opening up of the Home Energy Scotland loan scheme open to cover all homes.

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It was also suggested that grant-funded programmes need to be structured so as to stimulate and not crowd out alternative financing.

Finally, there were concerns that property owners and occupiers will find the highly complex funding landscape difficult to understand and navigate. There was a call for the Scottish Government to focus and streamline its activity, with clear and consistent messages regardless of property type or tenure. There was an associated concern that a dual focus on both addressing fuel poverty targets and climate change targets could lead to a lack of clarity and focus.

Conditional public funding: One theme was that accessing public sector funding could or should be contingent on achieving compliance with regulation. However, it was also noted that a degree of flexibility should be built in, for example if households are in fuel poverty.

A connected point was that delivery programmes should adopt and/or require compliance with PAS 2035 or a similar standard.

Best use of public sector estate: There was a call for the Scottish Government to maximise the use of public sector assets, programmes and initiatives and to demonstrate a high level of ambition as to what can be achieved. Examples of how this could be done included developing a Public Sector Estates Strategy that considers what future service provision will look like for each sector. It should cover asset management strategies and investment prioritisation and appraisal methodology. There was also reference to the public sector estate:

- Learning by doing; it was reported that government funded programmes often run over a number of years and involve multiple distinct phases. This offers numerous opportunities for developing demonstrator initiatives and projects, learning from these and then evolving and refining the approach.
- Providing anchor loads by offering large public sector buildings such as government and local authority buildings, hospitals and schools as long-term anchor loads for heat networks, thus helping to improve the efficiency and financial viability of such networks.

Role of local authorities: Local authorities were identified as being key to compliance and it was suggested that delivery programmes could work in partnership with them.

Training and development of supply chain: The importance of having a well-resourced and trained supply chain was highlighted, and it was suggested that delivery programmes could assist by supporting training opportunities through apprenticeships.

It was reported that Warmer Homes Scotland delivers industry-leading levels of quality and has consistent, bespoke compliance mechanisms built in, ensuring all contractors are working to consistent standards, and that independent quality inspections on jobs ensure compliance with these standards. It was argued that this approach is underpinned by transparency, accountability, and a focus on consistently high standards and that there is no reason why it could not be adapted and applied as a starting point for self-funded households and SMEs.

Monitoring and evaluation: Suggestions included that, wherever possible, outcomes from delivery programmes should be monitored in order to gather lessons for the wider industry and possible future regulation.

Question 51 - What other mechanisms/support may be required to ensure that regulation is fair and equitable for all?

The number of respondents answering Question 51 is set out below, with 57 respondents, or 32% of all respondents, answering.

Table 58

Question 51: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	5	9%
Consumer Advice, Advocacy or Campaigning	8	5	9%
Energy Generation, Supply or Distribution	20	6	11%
Housing Association	9	5	9%
Individual or Tenant Group	15	0	0%
Local Authority	23	11	19%
Product Manufacturer, Supplier or Installer	19	6	11%
Professional or Representative Body (Energy)	15	4	7%
Professional or Representative Body (Other)	21	8	14%
Public Body	7	3	5%
Third Sector or Non-Governmental Organisation	14	3	5%
Total	178	57	100%
% of all respondents commenting		32%	

Engagement and consultation: The Scottish Government's recognition that strong stakeholder engagement will be important was welcomed and it was suggested that local authorities should be given support and resources to ensure they can carry out public engagement where necessary. It was also suggested that there should be mechanisms for community engagement via the planning system to ensure people and communities have a say on decisions taken as a result of regulatory requirements that could fundamentally alter the appearance and characteristics of homes and places.

Awareness raising, information and advice: There was a call for substantial awareness raising work, including around the need for the changes which regulations stipulate. Equal access to information and advice was also seen as

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important, with further comments including that free and impartial information and advice about regulation will be needed, as will simple and clear guidance on the regulations. Further suggestions included that:

- Promoting positive case studies or developing large scale community pilots would help demonstrate what participation and outcomes look like.
- There should be equal access to advice regardless of housing sector or income.
- Any guidance issued by the Scottish Government must be equally accessible to groups who are traditionally digitally excluded.
- Post installation advice would help ensure people get the most out of their new energy efficiency and heating measures and that the envisaged cost and carbon savings are delivered in practice.

Financial support packages: This was the most frequently raised issue, with a number of comments addressing the importance of ensuring that sufficient and correctly targeted funding is available to encourage participation. Consumer Advice, Local Authority and Professional Body (Other) respondents were amongst those commenting. Reflecting some of the issues covered above about the complexity of the funding landscape, it was noted that there are a number of organisations or schemes currently offering support; this was seen as confusing for potential service users, with uncertainty as to the path to be followed potentially resulting in slow uptake.

In terms of key features required of any overall package of financial support, comments included that:

- Providing a degree of choice will be key to achieving consumer engagement.
- A 'first come, first served' approach must be avoided, with resources in place through the financial year or until the planned end of any funding scheme.
- Additional financial support may be necessary for remote and rural areas.
- Financial support should be available to support people in different circumstances including grant funding for low income households and loans or other financial products for others. Scottish Government support schemes should allow for situations where individuals do not have savings to cover upfront costs or assessments.

Reflecting this latter point, it was stressed that regulations should not penalise those who cannot afford to act, and that regulation should be 'fuel poverty proofed' to ensure those households who are less likely to be able to afford it do not suffer. In particular, it was noted that it cannot be assumed that an owner-occupier has the financial resources to adopt low/zero emissions technologies voluntarily. Where owners cannot afford to act in line with the regulation, there should be appropriate support, with further suggestions including that at the point of sale the obligation to meet the standard could be met by either the buyer or the seller; this would mean that people not able to improve their homes due to their individual circumstances would not be penalised.

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In terms of the types of work or costs that should be covered, one suggestion was that servicing costs could be included to help ensure that initial capital investment in installing heating systems would be protected into the future.

Tenure neutrality: there was a call for standards to be aligned across tenures, as envisioned by Housing to 2040, although it was recognised that it will take time for the private sector to catch up with progress in the social rented sector.

Facilitating choice: Ensuring that any approach to regulation does not unreasonably limit consumer choice, and in particular does not push people to use a specific technology, was seen as important. In particular, it was reported that inherent risks and challenges remain, such as an under-developed infrastructure, and people will not be confident in investing if early adopters have a bad experience.

Good lead in times: There was a call for a reasonable or long lead-in times to implementation. The regulatory framework should allow adequate time for financial support and incentives to be put in place and for homeowners and landlords to prepare.

Appropriate exemptions: As at other questions, there was reference to ensuring that the owners of particular types of property or of property in particular areas are not disadvantaged. In particular, it was seen as important to ensure that regulation is fair for those in rural areas and/or owning traditional buildings. Further comments included that it may not be cost-effective or technically feasible for some traditional buildings to reach EPC band C.

There was also a call for further investigation of the potential impact of the proposed regulations on the PRS, with a concern raised that many rural property owners may potentially remove houses from the PRS as a result of the high capital investment that would be required to meet the energy efficiency standards set out in the Strategy.

The consultation paper's reference to the possibility of introducing an exemption scheme for historic buildings which are unable to reach the targets was welcomed, and it was suggested that an exemption scheme should be given serious consideration. It was reported that the EPC exemption scheme in England has serious inadequacies, and that care should be taken to develop a system that is low-cost, offers clarity to owners, and does not present an administrative burden.

Creation of strategic partnerships: The creation of strategic partnerships was suggested as another supporting mechanism to bring about change, with the Glasgow Financial Alliance for Net Zero cited as an example. It was reported that strategic partnerships offer many benefits including an increase in information sharing, unlocking investment opportunities that would otherwise be unknown, job creation, unlocking innovation and a recalibration of risk appetite to accelerate change.

Chapter 9: The Economic Opportunity

Developing Scottish Supply chains – the net zero opportunity

Question 52 - What are your views on the plans set out to maximise the economic benefits to Scotland from the heat transition?

The number of respondents answering Question 52 is set out below, with 78 respondents, or 44% of all respondents, answering. Professional Body (Energy) and Third Sector respondents were amongst those making extensive comments at this question.

Table 59

Question 52: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	3%
Community Council, Trust or Group	6	2	3%
Consultancy, Training, Assessment or Accreditation	13	5	6%
Consumer Advice, Advocacy or Campaigning	8	5	6%
Energy Generation, Supply or Distribution	20	8	10%
Housing Association	9	6	8%
Individual or Tenant Group	15	1	1%
Local Authority	23	14	18%
Product Manufacturer, Supplier or Installer	19	8	10%
Professional or Representative Body (Energy)	15	7	9%
Professional or Representative Body (Other)	21	8	10%
Public Body	7	5	6%
Third Sector or Non-Governmental Organisation	14	7	9%
Total	178	78	100%
% of all respondents commenting		44%	

A number of respondents, from a range of respondent types, commented that the heat transition presents significant opportunities for economic benefits and supported the focus on maximising these benefits. This included support for supply chain development and associated job creation (particularly local supply chain development) and making use of the learning and experience across the sector. Respondents also referred to potential for reduced energy bills to free up consumer spending, and the value added to the economy. There was also reference to the benefits of reducing reliance on imported skills and products, in terms of energy security, and maximising benefits to local economies.

It was seen as important to ensure that the drive towards wider economic benefits is based on a holistic understanding of impacts. This included reference to the challenges in assessing the overall 'net' economic impact of the heat transition, and a perceived need for substantial work to develop the evidence base around likely impacts. It was suggested that this should include consideration of cross-sector impacts for transport, energy generation and storage and that delivery of the Strategy will require measurement of the net impact of each transition pathway, including how current jobs and supply chains can be sustained and evolved to contribute to a decarbonised heat sector.

Supply chain and job creation

As noted above, there was support for the role of supply chain development in realising economic benefits. In this regard, the Heat Pump Sector Deal was seen as an opportunity to drive growth in the supply chain and maximise wider economic benefits. This included calls for annual targets for deployment of low/zero emissions heating, and heat pumps in particular, to provide a roadmap to enable supply chain development. There was a call for further detail on the Deal, and there was reference to the importance of government engagement with industry to identify opportunities and barriers to developing the supply chain.

There was support for establishment of a Sustainable Energy Supply Chain programme, and a hope that the programme will represent the whole supply chain. There were also calls for a new programme focused on energy efficiency and zero emission.

Opportunities for job creation were highlighted as a key element in maximising wider economic benefits associated with supply chain development, including reference to the potential for delivery of green jobs. There were calls for more support for skills development to maximise job creation, including a focus on bringing new people into the sector, and there was also reference to the potential for re-deployment of expertise and skills from existing supply chains. Other comments included that PAS 2035 and the retrofit process will also create many skilled jobs and that there should be a focus on the longer-term need for diagnostic and repairs skills, in addition to shorter-term growth of installer numbers.

There was support for the commitment to building local supply chains and maximising local job creation. These were seen as essential in ensuring a just transition for communities and there was reference to local supply chain development delivered to date through Warmer Homes Scotland. Respondents also wished to ensure that engagement with the sector includes organisations who can work to support local economies and communities. This included calls for engagement to include local authorities, enterprise agencies, third sector organisations, and Development Trusts.

There was a focus on realising benefits for rural and island communities, with reference to high installation and maintenance costs, and a limited supply chain. It was also suggested that analysis of energy efficiency and low carbon supply chains could be used to identify opportunities for industry expertise within Scotland to replace foreign expertise.

Other points raised around supply chain development included that:

- It will be important to ensure that the supply chain is prepared for the transition to decarbonised heat, and there was support for awareness raising including through the Sustainable Energy Supply Chain Programme.
- Some of the supply chains required by the heat transition will be globalised and will require co-ordination with the rest of the UK and Europe. Co-ordination of implementation guidelines with the rest of the UK could help - avoid putting Scotland at an economic disadvantage.
- In addition to supporting the decarbonisation of heat, investment in the sector will contribute to the wider post-COVID economic recovery.

Low/zero emissions technologies and innovation

There was also reference to the opportunities associated with development of specific low/zero emissions heat technologies, which were often also associated with job creation. For example, in relation to heat networks it was suggested that ensuring a clear pipeline of projects can support creation of jobs in the short term to develop the required infrastructure, and over the longer-term through maintenance and repair works. However, it was also suggested that there are challenges in realising economic opportunities as supply chain requirements are likely to vary across different building sectors.

Respondents also referred to potential economic benefits associated with other technologies, including:

- Bioenergy, with reference to potential for adaptation of existing fossil fuel infrastructure.
- The conversion of the gas network to hydrogen including potential for hydrogen export.

The potential for the energy efficiency sector to deliver wider economic benefits was also highlighted, including by improvements to energy efficiency generating savings to household energy bills, meaning more money can be spent on local goods and services.

Respondents also welcomed support for innovation, including a dedicated workstream within a new framework for innovation in Scotland. Innovation was described as critical to achieving the transition to low/zero emissions heat, including reference to innovation in products, services and business models. Other suggestions as to how the economic benefits of the transition to decarbonised heat could be maximised included:

- Creating long-term certainty for the market, encouraging businesses to invest in the supply chain, and to enable development of longer-term business models.
- Early and effective communication to ensure the industry has a good understanding of the changing regulatory environment, including key milestones. This was seen as essential in maintaining confidence and encouraging investment to drive supply chain development, and ultimately realising the economic benefits of the heat transition. The Green Homes

Grant Voucher Scheme was cited as an example of the value of early messaging and clear guidance.

- Greater co-ordination of support to encourage investment in supply chain development. The landscape of existing government support schemes was described as ‘fragmented’.
- Using public procurement in maximise the benefit to local economies. The challenges facing small businesses in selling to the public sector, particularly in rural and island areas, were noted and there was reference to how public contracts are structured and delivered. There was a perceived need for public procurement to take greater account of the barriers that smaller contractors face.
- Using a publicly-owned delivery vehicle as a means to develop projects over the longer-term, and take the risks required to maximise economic benefits.

Question 53 - What role could technology-specific milestones (for example, by 2025) play in supporting supply chain development, and how should these milestone levels be developed?

The number of respondents answering Question 53 is set out below, with 57 respondents, or 32% of all respondents, answering.

Table 60

Question 53: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	4%
Community Council, Trust or Group	6		0%
Consultancy, Training, Assessment or Accreditation	13	4	7%
Consumer Advice, Advocacy or Campaigning	8	3	5%
Energy Generation, Supply or Distribution	20	6	11%
Housing Association	9	3	5%
Individual or Tenant Group	15	2	4%
Local Authority	23	11	19%
Product Manufacturer, Supplier or Installer	19	9	16%
Professional or Representative Body (Energy)	15	6	11%
Professional or Representative Body (Other)	21	4	7%
Public Body	7	3	5%
Third Sector or Non-Governmental Organisation	14	4	7%
Total	178	57	100%
% of all respondents commenting		32%	

A number of respondents, from a range of respondent types, noted their support for technology-specific milestones as a means of building towards the 2045 net zero target, including because they could:

- Help encourage investment in the supply chain by providing confidence in the long-term workstream.
- Form part of the Supply Chain Development Programme. This was seen as particularly valuable in stimulating investment in the skills development required to build the installer base required to meet targets and in targeting support for innovation.
- Enable industry to formulate the most efficient and cost-effective means of delivering against a clear set of milestones.

In terms of key requirements of technology-specific milestones, it was suggested that they must:

- Be credible and achievable, and supported by sufficient government support, policy and regulation. There was a concern that setting overly ambitious targets which are not then met could be highly damaging for the industry.
- Strike the right balance between providing market confidence, and being overly prescriptive regarding the types of heating systems that are permissible. This reflected concerns that milestones must not limit investment in potentially viable technologies, nor stifle innovation.

Another perspective was that emission-specific, rather than technology-specific, targets would be more consistent with the strategic objective of reducing heating-related emissions.

In terms of identifying appropriate milestones, respondents suggested a collaborative approach should be adopted, possibly by building on the Heat Pump Sector Deal and other existing work with the industry or through the creation of working groups for each sub-sector. The potential for milestone development work to form part of the Supply Chain Development Programme was also noted.

In terms of the general parameters for the milestones, the main points raised were that:

- Targets for the minimum supply of thermal energy to be supplied by heat networks have been set in the Heat Networks (Scotland) Act 2021.
- Milestones should also take account of the UK-wide approach to decarbonisation.
- The setting of milestones must consider the implications for electricity network planning.
- ‘Granular’ milestones would be most beneficial in terms of directing investment in the supply chain and would reflect the need for rapid progress.

Specific suggestions included for:

- Annual targets, or interim targets for each 3-5 year period.

- Area based targets, including for example links to LHEES and heat network zones.
- Milestones relating to heat pump installations, heat network development, deployment of smart energy systems, use of thermal storage, the volume of whole-house retrofits, energy efficiency upgrades, and hydrogen and green gas development.

Question 54 - Is there anything further that can be done to ensure that Scotland realises the economic opportunity available from the heat transition?

The number of respondents answering Question 54 is set out below, with 59 respondents, or 33% of all respondents, answering.

Table 61

Question 54: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	2%
Community Council, Trust or Group	6	0	0%
Consultancy, Training, Assessment or Accreditation	13	5	8%
Consumer Advice, Advocacy or Campaigning	8	3	5%
Energy Generation, Supply or Distribution	20	7	12%
Housing Association	9	3	5%
Individual or Tenant Group	15	3	5%
Local Authority	23	14	24%
Product Manufacturer, Supplier or Installer	19	5	8%
Professional or Representative Body (Energy)	15	3	5%
Professional or Representative Body (Other)	21	8	14%
Public Body	7	3	5%
Third Sector or Non-Governmental Organisation	14	4	7%
Total	178	59	100%
% of all respondents commenting		33%	

One perspective was that the actions set out in the draft Strategy should be sufficient to ensure economic opportunities are realised. Others re-iterated suggestions and comments covered at Questions 52 and 53, including calls for a technologically diverse approach to decarbonisation, investment in skills development, and engagement between government and industry.

Suggestions for further action included:

- Ensuring the heat transition takes account of the impact of COVID-19, and that the economic benefits of decarbonised heat are integrated into the wider recovery plan.
- Establishing a national ‘heat hub’ as a centre for collaboration, with a focus on maximising the economic opportunities from the heat transition. It was suggested that this could continue to be a focus for the developing industry, for example in delivering training and skills development, sharing good practice and supporting innovation.
- Providing additional support for existing programmes to enable the required speed of delivery. This included a suggestion that rapid supply chain development is required to compete with developing overseas suppliers.
- Developing the manufacturing of domestic-scale heat pumps in Scotland.
- Greater collaboration with the rest of the UK and Europe to maximise export opportunities alongside development of the supply chain in Scotland. This included recommendations for adoption of UK and international standards.
- Use of the heat transition to encourage international investment, to support the low carbon supply chain, but also more widely through the creation of high quality commercial spaces.
- Removing ‘burdensome’ regulation (including reference to PAS 2035) and reviewing procurement legislation and thresholds to enable local businesses to participate.
- Investing in the ‘traditional’ building skills required for low/zero emissions heating to operate effectively. This included reference to the importance of SMEs for this traditional sector of the industry.
- Supporting offshore wind generation as part of the response to increased electricity demand.

Question 55 - What more can be done to support the development of sustainable, high quality and local jobs in the heat and energy efficiency supply chain across the breadth of Scotland?

The number of respondents answering Question 55 is set out below, with 75 respondents, or 42% of all respondents, answering.

Table 62

Question 55: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	7	9%
Consumer Advice, Advocacy or Campaigning	8	4	5%
Energy Generation, Supply or Distribution	20	7	9%
Housing Association	9	5	7%
Individual or Tenant Group	15	5	7%
Local Authority	23	15	20%
Product Manufacturer, Supplier or Installer	19	8	11%
Professional or Representative Body (Energy)	15	6	8%
Professional or Representative Body (Other)	21	8	11%
Public Body	7	4	5%
Third Sector or Non-Governmental Organisation	14	4	5%
Total	178	75	100%
% of all respondents commenting		42%	

Some of the comments addressed issues around support for industry and the development of the supply chain covered at previous questions.

With specific reference to job development comments included that it will be important to engage the industry through a publicity programme, to capture hearts and minds and ensure the sector accepts the necessity of the heat transition, and the potential benefits for industry. As at other questions, the importance of a clear long-term policy framework in providing the certainty required to support investment in jobs was also highlighted, and there was reference to:

- The relevance of the Supply Chain Action Plan and the Climate Emergency Skills Action Plan.
- PAS 2035 and the associated framework as an example of a policy initiative with potential to create high quality jobs.
- The role of regulation and quality standards in ensuring the quality of jobs created across the supply chain.

There was also reference to the potential benefits of export growth for job creation, including the suggestion that investment to establish Scotland as an international centre of low/zero emissions heat expertise would have a significant impact on the supply of quality, sustainable jobs. Demonstrator projects were seen as having a

role to play in motivating industry and consumers and there was a call for these projects to be supported and promoted.

Skills development and training were also seen as key to supporting the creation of high quality, sustainable jobs and it was suggested that a package of support for training and skills development is needed. A specific suggestion was for funding to attend and, particularly for those in rural areas, travel to training courses. There were also calls for investment in training and development to be sustained in order to ensure that the skills base is kept up to date with policy developments and emerging technologies.

A range of programmes and bodies were identified as having a potential role to play in skills development and facilitating engagement between the Scottish Government and industry. These included: EU Skills; Scottish Apprenticeship Advisory Boards; Skills Development Scotland; the Green Jobs Skills Hub; the Young Person's Guarantee Scheme; the National Transition Training Fund; and the Green Jobs Fund. It was suggested that these bodies have an opportunity to share best practice and help to develop a pipeline of skills for the industry.

Other suggestions included:

- Dedicated working groups for each subsector relevant to low/zero emissions heat, to inform support for job development.
- Local partnerships to support skills development and promote energy/heat sector careers. This included a suggested role for employers, local further and higher education providers, and other stakeholders.
- Investment in the education sector and careers opportunities including providing broader access to apprenticeships across the sector. This reflected a perceived need to incentivise uptake of routes into the sector. Some also wished to see acknowledgement of the role of the further education sector as providers of training and skills development, with funding support for this sector.

The potential for re-deployment of skills and capacity from the existing supply chain was also raised, with one perspective being that net growth in jobs may be relatively limited, given the size of the existing pool of heating installers who could shift over to delivering low/zero emissions heat. There were calls for dedicated support to facilitate this re-deployment, including schemes to recognise existing experience, for example where this is not linked to a formal qualification or accreditation.

The importance of ensuring access to suitable, high quality skills development and training across Scotland, including rural and island locations, was highlighted. This included reference to a potential role for remote training via digital means, to maximise access to training, and minimise associated costs. The importance of good connectivity in remote and rural areas was noted here. Other comments also addressed improving the depth and diversity of the supply chain and included that there is still some work to do to ensure the workforce is representative of our diverse population.

The public sector was identified by some as having an opportunity to further support development of sustainable and local jobs. This included reference to potential for public procurement to maximise use of local labour, for example through social housing retrofit, and enhancing social value. In this context, concerns were raised regarding the extent to which current procurement rules can exclude SMEs (seen as a key sector in terms of ensuring development of local job opportunities). There were also calls for a commitment to green procurement to further support development of sustainable and high-quality jobs. Respondents noted the availability of procurement training with a specific focus on the circular economy.

In addition to comments on how skills development and training might be stimulated or supported, respondents also addressed the profile of jobs that could be expected from the low/zero emissions heating and energy efficiency supply chains.

Points raised included that specific sectors have the potential to support the development of sustainable, high quality and local jobs. There was reference to: energy network upgrades (electricity and gas); energy efficiency; heat networks; heat pumps; ongoing servicing and maintenance for the domestic and commercial sectors; and biomass (with a focus on local production and use). Respondents highlighted the specific importance of SMEs across these sectors. There was also a call for a targeted approach to supporting job development, based on a detailed analysis of opportunities across each sector. The Consultation on Scottish skills requirements for energy efficiency, zero emissions and low/zero emissions heating systems, microgeneration and heat networks for homes was also highlighted as an opportunity to target support for job creation¹⁷.

Respondents also highlighted the importance of a geographic focus in supply chain development and job creation. This included reference to potential for job creation to vary across Scotland – for example with energy efficiency opportunities likely to be seen across the country, but heat network opportunities likely to be more targeted around specific locations. As noted above, the specific challenges facing rural and island communities were highlighted here. It was also suggested that opportunities for supply chain development (particularly for heat pumps) could align with regeneration areas. The importance of LHEES in directing investment and job opportunities was reiterated.

A range of suggestions was made around the creation of a 'national heat hub', 'sustainable enterprise areas', 'net zero capitals' and (at a smaller scale) local 'hubs' for low/zero emissions heat development and innovation. In addition to a geographical focus for supply chain development and investment, these suggestions also appeared to reflect the perceived importance of collaboration in maximising development of high quality, sustainable jobs. These centres and hubs were suggested as a means of bringing together the supply chain, developers, skills, innovators and investors to maximise supply chain growth and job development.

¹⁷ Available at: <https://consult.gov.scot/energy-and-climate-change-directorate/skill-requirements-for-energy-efficiency-homes/>

Question 56 - In your view, what are the opportunities and constraints presented by the role of the wider public sector in maximising the economic benefits to Scotland?

The number of respondents answering Question 56 is set out below, with 49 respondents, or 28% of all respondents, answering.

Table 63

Question 56: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	2	4%
Consumer Advice, Advocacy or Campaigning	8	1	2%
Energy Generation, Supply or Distribution	20	4	8%
Housing Association	9	4	8%
Individual or Tenant Group	15	1	2%
Local Authority	23	13	27%
Product Manufacturer, Supplier or Installer	19	4	8%
Professional or Representative Body (Energy)	15	4	8%
Professional or Representative Body (Other)	21	6	12%
Public Body	7	4	8%
Third Sector or Non-Governmental Organisation	14	5	10%
Total	178	49	100%
% of all respondents commenting		28%	

Respondents saw the public sector as having a significant role to play across all aspects of the heat transition, including in maximising economic benefits of the transition. Opportunities identified included the use of investment in public buildings to take a leadership role in deployment of low/zero emissions heat. This was a frequently made suggestion and was made by a range of respondent types.

There were calls for ambitious low/zero emissions heat targets for the sector with other comments including that:

- Investment in the public sector offers a key opportunity to stimulate investment in the supply chain, demonstrate cost effective approaches to low/zero emissions heat and set an example for private sector buildings. This would take advantage of the public sector’s real estate and borrowing capacity to help drive the early stages of the heat transition.

- There is potential for public bodies to take a leadership role in implementation of standards as part of the heat transition. The Net Zero Public Sector Building Standard was highlighted as an opportunity.
- There is an opportunity to identify public sector buildings which can act as heat anchor loads for heat networks, and thus help to reduce the heat demand risk seen as a potential barrier to heat network development.

Respondents also referred to a positive role for public bodies, and especially local authorities, in engaging with communities (including community organisations) to raise awareness and understanding of low/zero emissions heat. This was a more frequently raised theme, with Local Authority respondents amongst those highlighting this issue. Further comments included a suggested role for public bodies in promoting successful low/zero emissions heat projects to increase public confidence in technologies and drive the behaviour change required to deliver the transition and to drive local skills development

The opportunity for the public sector to take a leadership role through greener and more sustainable procurement was also highlighted, with a suggestion that carbon assessment be included as part of all public sector tendering for heat and related systems. This was also a more frequently raised theme, with Energy generation and Professional Body (Energy) respondents amongst those highlighting this opportunity. Public sector leadership was seen as having potential to stimulate growth in green supply chains and job creation, with reference made to the UK Government *Greening Government Commitments* as a potential model.

Respondents also highlighted potential for public sector procurement to support SME local contractors, with some suggesting that current rules are a barrier to SMEs. Potential for use of supply chain development agreements with the industry was also suggested.

However, current procurement regulations were highlighted as potentially limiting the role of the public sector in maximising economic impacts. In this context, there was support for adoption of PAS 2035 across low/zero emissions heat delivery programmes.

Opportunities for public bodies or the third sector to work in partnership with the industry to support supply chain development and use of local skills in low/zero emissions heat deployment, were also highlighted. Respondents referred to the success of current examples of these partnerships, including Tighean Innse Gall's work with the local authority, Home Energy Scotland, Western Isles NHS, Western Isles Citizens Advice and Outer Hebrides Community Planning Partnership through their Gluasad Comhla (Moving Together) programme. There was also reference to the Net Zero Modules developed by Zero Waste Scotland and City of Glasgow College, and Zero Waste Scotland's Net Zero tools for organisations and businesses.

It was suggested that Enterprise agencies have a key role to play and can increase their individual impacts through working collaboratively to support our businesses and communities, with the work of the Energy Transition Group in the south of Scotland noted.

The Climate Emergency Skills Action Plan was also cited as an opportunity for more partnership working.

Respondents also identified a number of potential constraints on the role of the public sector in maximising the economic benefits of the heat transition. These included that:

- While the public sector estate offers an opportunity to take a lead in deployment of low/zero emissions heat, public bodies are not funded to take this role and have limited experience. This was highlighted as a concern in the context of the high development costs of low/zero emissions heat technologies. It was suggested that there may be a need to 'buy in' the expertise required to build capacity across the public sector.
- Overall levels of public sector resourcing could be an issue, and there is the potential that other priorities will further limit capacity to take a lead in the heat transition, particularly as bodies focus on recovery from the COVID pandemic. This included reference to obligations on public bodies around LHEES, EESSH2, heat network zones, and required network upgrades.
- The focus on making rapid progress towards climate change targets has contributed to a reluctance to invest in higher risk, innovative technologies. This was seen as a potential ongoing constraint unless testing and adoption of these technologies are ramped up.

It was suggested that, to date, the public sector has failed to deploy low/zero emissions heat at volume, including a view that reducing energy costs has been prioritised over decarbonisation. With specific reference to public sector housing, the challenges associated with an ageing public sector building stock were noted as a possible constraint on public sector leadership in low/zero emissions heat deployment.

Equipping Scotland's workforce with zero emissions heat skills for the future

Question 57 - In recognition of the proposals in the forthcoming skills consultation, what further action can be taken to support skills development in Scotland over the lifetime of this strategy?

The number of respondents answering Question 57 is set out below, with 67 respondents, or 38% of all respondents, answering. Product Manufacturer and Professional Body (Energy) respondents were amongst those making extensive comments at this question.

Table 64

Question 57: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	1%
Community Council, Trust or Group	6	1	1%
Consultancy, Training, Assessment or Accreditation	13	7	10%
Consumer Advice, Advocacy or Campaigning	8	5	7%
Energy Generation, Supply or Distribution	20	4	6%
Housing Association	9	5	7%
Individual or Tenant Group	15	1	1%
Local Authority	23	14	21%
Product Manufacturer, Supplier or Installer	19	8	12%
Professional or Representative Body (Energy)	15	5	7%
Professional or Representative Body (Other)	21	8	12%
Public Body	7	4	6%
Third Sector or Non-Governmental Organisation	14	4	6%
Total	178	67	100%
% of all respondents commenting		38%	

Skills development was seen as a vital element of the Strategy, with a suggestion that employment and skills gaps could be a key obstacle to delivery of Strategy targets. Evidence was cited of the volume of new workers in the sector required to support delivery of targets and it was suggested that recruitment and skills development will be needed on an unprecedented scale to meet these requirements. Compounding concerns around the volume of new workers required, some suggested that new entrants to the sector are likely to require training to a higher level than previously expected. This included reference to the additional complexity of low/zero emissions heating installations, and the need for training to incorporate whole system integration and aftercare/advice, for example.

In addition to the scale of skills development required, respondents also identified a range of other challenges to be addressed through the Strategy including:

- The importance of developing the right skills to support a low carbon future. It was suggested that industry will require clearer signals from the Scottish Government about future work pipelines, to identify the mix of skills required. It was also noted that the skills/training sector must be in a position to respond and deliver the right mix of skills.
- Current training provision may not be sufficient to deliver the growth in worker numbers required. This included concerns around the availability of training

provision, and the approach to skills development (e.g. workers being required to go through an apprenticeship and then be upskilled).

- Existing further education (FE) provision is insufficient to deliver the skills required for heat pump deployment. Engagement with FE providers to develop the offering was suggested, and there was a concern that the existing FE funding model may constrain the sector's ability to respond to the anticipated increase in demand.
- Upskilling will be required for a large proportion of current heating installers, to enable them to install low/zero emissions heat technologies. There was also concern that retraining must be available across the whole of the existing supply chain, ensuring that 'no one is left behind'.

The risk of competition for skilled workers from other sectors, a limited pipeline of young people seeking STEM qualifications, a particular lack of supply of potential workers in rural and island locations, a lack of gender diversity, and a 'baby boomer retirement crunch' were all suggested likely to limit the supply of workers.

Respondents made a broad range of suggestions regarding the response to these challenges. As noted earlier, some saw a need for a very substantial recruitment drive. This included calls for new, more flexible programmes to bring people into the sector, to achieve the volume required. Incentive payments to existing MCS-accredited heat pump installer companies to bring on new heat pump installers were suggested (with payments linked to the number of new installers produced). Extending the Construction Industry Training Board levy to include renewable heating and thus enable the heat pump sector to access installer training funds was also suggested.

There were also calls for a strategic approach to provision of education and training, to achieve the 'step change' required to deliver against Strategy targets. This was a more frequently raised issue and was highlighted by a range of respondent types. Further comments included a perceived need for industry-wide investment in skills development, including support to incentivise businesses to take on more apprenticeships. There was support for the proposed consultation on skills development, with the Climate Emergency Skills Action Plan and recommendations of the Energy Efficiency Supply Chain and Skills Working Group identified as positive steps in developing a co-ordinated approach. There was also support for the Scottish Government working with Skills Development Scotland, the Scottish Qualifications Authority, and the Scottish Funding Council in developing the education and training response required.

Reflecting the above points, there was a call for additional support for the education and training sectors to facilitate the investment required to respond to increasing demand. This included a suggested focus on raising awareness of the sector as a career destination from the school stage, including promotion of STEM qualifications. Additional funding to Scottish colleges was suggested, as was development of regional Centres of Excellence for low/zero emissions heat, acting as training centres but also sharing experience.

Respondents also referred to a need for additional support to enable the re-skilling and re-training of current heating installers, with the proportion of current installers requiring training to deliver low/zero emissions heat highlighted. Potential to target current air conditioning installers, who were described as having some of the skill set required for heat pump installation, was also suggested.

In addition to a focus on provision of education and training, respondents also saw a need for development of standards, accreditations and relevant qualifications. This was seen as particularly important in the context of the requirement for significant re-training of existing installers, and a review of existing qualifications and apprenticeship standards was suggested. For heat pumps, there was support for a 'Low Temperature Heating and Hot Water in Dwellings Qualification', and a 'Heat Pump Training Course'. For heat networks, it was suggested that training provision must also include continuous professional development. Reference to other potentially relevant standards and qualifications included TrustMark.

Question 58 - Are you aware of any barriers to the reskilling of existing oil and gas heating engineers to equip them to install low and zero emission heating?

The number of respondents answering Question 58 is set out below, with 56 respondents, or 31% of all respondents, answering, although some simply to note they were not aware of any barriers. Product Manufacturers were amongst those making extensive comments at this question.

Table 65

Question 58: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	5	9%
Consumer Advice, Advocacy or Campaigning	8	2	4%
Energy Generation, Supply or Distribution	20	5	9%
Housing Association	9	3	5%
Individual or Tenant Group	15	3	5%
Local Authority	23	11	20%
Product Manufacturer, Supplier or Installer	19	11	20%
Professional or Representative Body (Energy)	15	7	13%
Professional or Representative Body (Other)	21	4	7%
Public Body	7	1	2%
Third Sector or Non-Governmental Organisation	14	3	5%
Total	178	56	100%
% of all respondents commenting		31%	

The importance of reskilling existing oil and gas heating engineers in delivering against Strategy targets was reiterated as were other points already considered at Question 57. Concerns were also raised that the framing of the question does not acknowledge that a substantial part of the activity required to support the heat transition will be focused on energy efficiency upgrades. It was noted that the transition will also require technicians and assorted other trades, in addition to engineers.

Some respondents felt that existing oil and gas engineers are well placed to adapt to low/zero emissions heat installation. This included the frequently made suggestion that the skills are highly transferable. Energy Generation, Professional Body Energy) and Product Manufacturers were amongst those making this suggestion. It was also suggested that, although distinct in their requirements, low/zero emissions heat installations are no more complicated than fossil fuel systems. The alignment of skills was seen as particularly close for hydrogen appliances and bioenergy.

However, others identified a range of factors that were seen as barriers to re-skilling existing oil and gas heating engineers.

Potential barriers

The specific requirements of low/zero emissions heat were suggested as a barrier to re-skilling, including reference to the importance of calculation, sizing and design in low/zero emissions heat installation.

'Overly bureaucratic' training and accreditation schemes were argued to have discouraged oil and gas heating engineers from considering a move into low/zero emissions heat. This included reference to the Gas Safe Register and Microgeneration Certification Scheme (MCS). Feedback from engineers indicating a view that schemes act as a barrier for smaller installers was reported

Limited time available to installers and the cost of re-skilling were both highlighted as potential barriers. Cost was the most frequently identified potential barrier, with Local Authority and Product Manufacturer respondents amongst those raising this issue. Some respondents noted the extent to which the oil and gas heating sector is dominated by SMEs, and suggested that installers will be unwilling to invest in training without the certainty of future demand for those skills. This included a view that there may be concerns that the supply of low/zero emissions heating installers could outstrip demand, at least for a period. It was also suggested that a lack of a clear timeline for phasing out oil and gas heating has been a barrier to installers choosing to re-skill.

Potential resistance of some oil and gas heating engineers to a move into the low/zero emissions energy sector was also suggested. Evidence was cited of the age profile of oil and gas heating installers, and it was argued that an ageing installer base will be less motivated to re-skill. Anecdotal evidence of a lack of clarity amongst oil and gas heating engineers regarding pathways into the low/zero emissions energy sector was also referenced.

Other potential barriers included that:

- Inequalities in access to training across Scotland may prevent some oil and gas engineers from entering the low/zero emissions energy sector.
- Experience of the oil and gas sectors has contributed to high salary expectations.

Question 59 - How can we support the development of more opportunities for young people?

The number of respondents answering Question 59 is set out below, with 65 respondents, or 37% of all respondents, answering.

Table 66

Question 59: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	2%
Consultancy, Training, Assessment or Accreditation	13	6	9%
Consumer Advice, Advocacy or Campaigning	8	3	5%
Energy Generation, Supply or Distribution	20	6	9%
Housing Association	9	4	6%
Individual or Tenant Group	15	3	5%
Local Authority	23	13	20%
Product Manufacturer, Supplier or Installer	19	8	12%
Professional or Representative Body (Energy)	15	8	12%
Professional or Representative Body (Other)	21	5	8%
Public Body	7	3	5%
Third Sector or Non-Governmental Organisation	14	5	8%
Total	178	65	100%
% of all respondents commenting		37%	

A need for the heat transition to engage young people, and to supply a new generation of installers was recognised, and it was noted that a potentially substantial proportion of the current installer base can be expected to retire over the next 10 years.

Respondents saw a range of opportunities to create pathways to encourage more young people to enter the sector, and it was suggested that the period over which the heat transition will be delivered provides time to build pathways for young people. There was also a view that the focus on emission reduction and climate change targets should resonate with young people, with positive responses to existing initiatives focused on engaging young people noted. It was also suggested that a focus on developing opportunities for young people could form part of the wider green economic recovery, with evidence cited of the disproportionate impact of the COVID-19 pandemic on under 35s.

Investment in further/higher education and the apprenticeship system

Investment was identified as a key means of ensuring a supply of young people for the sector. It was a frequently raised issue and was raised by a range of respondent types. In relation to apprenticeships, this included a suggested need for more flexibility in the system, including 'fast-track' apprenticeships. It was noted that existing training opportunities include a significant fossil fuel element before young people are able to access low/zero emissions heat specific courses, and there were

calls for more direct routes into the low/zero emissions heat sector. Incorporating renewable heat modules in all plumbing and electrical apprenticeships was also suggested. Other pathways such as green internships, the Domestic Energy Assessor courses and PAS 2035 courses were also seen as having a role alongside apprenticeships.

Incentives and other support for businesses recruiting young people and supporting apprenticeships were suggested. It was also argued that industry will require confidence in the future pipeline of low/zero emissions heat work to invest in apprenticeships and other programmes.

A focus on the further/higher education sectors as pathways into low/zero emissions heat was also suggested. This included support for more involvement for industry, working with further and higher education sectors to improve the quality of provision. Respondents saw a need for clarity on the timing and scale of investment in energy networks, to inform development of education provision and apprenticeships. A need for local or regional academies was suggested in order to focus on the suite of skills needed to support energy transition.

Promoting low/zero emissions heat careers in schools

Promotion of careers in the sector to school age children was a frequently made suggestion and was highlighted by a range of respondent types. It was seen as crucial to the development of opportunities for young people. This included reference to the value of reaching young people at an early stage. There was a call for development of career route maps for low/zero emissions heat, and there was support for the Scottish Government's work to develop a clear skills pathway. Promotion of self-employment and entrepreneurship was also suggested.

Limited awareness of the sector was suggested to be a barrier to young people taking up available opportunities, although it was also thought that perceptions of the sector need to be modernised, to improve understanding of the range of roles available, and to emphasise the scale of opportunity associated with the heat transition. Collaboration with industry was again suggested as a key element in raising the profile of the sector. This included reference to current pilot schemes seeking to engage young people in work to make schools and learning environments greener and other real-world low/zero emissions heat projects. As noted above, some respondents recommended a specific focus on the contribution to tackling climate change and delivery of carbon reduction targets, to make the sector a more positive choice for young people.

Collaboration was also highlighted as a key element in ensuring young people can access effective opportunities to enter the low/zero emissions heat sector. There were calls for continuing work with the Scottish Qualifications Authority, Energy Skills Partnership and Skills Development Scotland (SDS) to embed climate change within the school curriculum, and to shape training provision. This included reference to specific SDS programmes such as Developing the Young Workforce and My World of Work. The Climate Emergency Skills Action Plan was seen as having a role in shaping the approach to developing opportunities for young people. A role for the Construction Industry Training Board was also suggested.

Other approaches

Other suggestions included:

- Engagement with communities as a means of enabling school leavers and other young people to explore the range of opportunities in the low/zero emissions heat sector. Use of local community hubs was also suggested to provide young people with an opportunity to hear from those working in the sector.
- Use of non-formal routes to develop talent, including community-based initiatives.
- Targeting specific groups of young people such as funded training courses for the unemployed, including those at risk of long-term unemployment.
- Work to improve representation of gender and ethnicity in particular. A lack of diversity in the industry was identified as a barrier to recruitment for young people.
- Use of public procurement to secure provision of apprenticeships, internships and other pathways for young people, for example by requiring these as a social benefit.

Chapter 10: Working with the UK Government

The consultation paper notes that transforming the building stock will require new policy and updated regulation across a wide range of areas. Some of the powers likely to be needed, such as regulation of building level greenhouse gas emissions, are currently devolved to the Scottish Government. However, other powers, including many aspects of energy policy, remain reserved to the UK Government and, as a consequence, UK Ministers will need to take decisions that facilitate Scotland's meeting of pathways set out in the Climate Change Plan Update.

Question 60 - To what extent do you agree that the issues identified must be addressed jointly by the UK and Scottish governments to unlock delivery in Scotland?

Question 61 - Are there any further areas where joint action is required, for example to ensure no one is left behind in the transition and fuel poverty is addressed?

There was considerable overlap in the points raised across Questions 60 and 61, with 97 respondents, or 54% of all respondents, answering one or both questions. A single analysis across the two questions is presented below.

Table 67

Questions 60 and 61: Number of comments at either or both by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	2%
Community Council, Trust or Group	6	2	2%
Consultancy, Training, Assessment or Accreditation	13	9	9%
Consumer Advice, Advocacy or Campaigning	8	4	4%
Energy Generation, Supply or Distribution	20	14	14%
Housing Association	9	8	8%
Individual or Tenant Group	15	6	6%
Local Authority	23	15	15%
Product Manufacturer, Supplier or Installer	19	6	6%
Professional or Representative Body (Energy)	15	7	7%
Professional or Representative Body (Other)	21	13	13%
Public Body	7	5	5%
Third Sector or Non-Governmental Organisation	14	6	6%
Total	178	97	100%
% of all respondents commenting		54%	

Many respondents, from a broad range of respondent types, expressed a general agreement with the need for a joint approach between the Scottish and UK Governments, with some agreeing specifically that the issues identified should be addressed jointly. Joint working was considered particularly important in areas such as energy where there is a mix of reserved and devolved powers and it was suggested co-ordination between all UK nations will allow more opportunities for sharing ideas, and for enhanced learning and innovation.

The importance of clear and consistent policies across the UK was suggested, including because this can: reduce confusion and increase compliance; help to standardise technology designs, which can drive costs down; allow supply chains to work across the UK without red tape; and provide certainty for homeowners, lenders and the housing market. It was argued delivery at the pace outlined in the draft strategy will be much more difficult to achieve if not aligned to the UK-wide approach.

However, it was also argued to be important that the workings of the Internal Market Act do not inhibit an increase in standards in Scotland, and that both Governments are sensitive to such a risk. The importance of retaining sufficient flexibility to allow for national differences in the approach to net zero was also highlighted and for Scotland to be able to adjust in relation to natural resources such as wind.

Mapping out areas where developments could be progressed independently of the UK Government and areas that cannot be separated was proposed and it was argued that the Scottish Government make every effort to reach its targets even if it is not always possible to reach agreement with the UK Government.

Taxes and levies

The consultation paper notes that the Scottish Government is urging the UK Government to act on the UK Climate Change Committee's recommendation to rebalance environmental and social obligation costs (levies) on energy bills to reduce the difference in unit costs between gas and electricity.

A number of respondents, from across a range of respondent types, noted their support for this position, with a view that the disparity in levies must be addressed and that the price of electricity for consumers must be reduced if the transition is to succeed while ensuring electrification of heat does not exacerbate fuel poverty. Some respondents argued that policy costs should be removed altogether. Suggestions included:

- A carbon tax on gas that could be used to fund a targeted rebate to vulnerable customers adversely affected by the change.
- Increased spending through the benefits system funded by general taxation.

It was also argued that, while there is a need to consider rebalancing costs that are incurred by electricity and gas consumers, there should also be a focus on targeting interventions at convenient points with a combination of tax incentives, regulation and low-cost finance.

The consultation paper also states that the Scottish Government would like to see changes to the VAT regime so that all energy efficiency and renewable heat retrofit installations receive reduced or zero VAT rate. Again, there was agreement with this view, with VAT being the most frequently raised issue at Question 60. There were also calls for parity in VAT between new-build activity and repair, maintenance and retrofit/energy efficiency measures with suggestions that the current situation discourages repairs and retrofitting of existing homes when compared to the incentives available for the purchase of new homes.

Other points on VAT included:

- Reduction or removal of VAT should be extended to flexibility measures such as domestic batteries and thermal storage which will help keep the cost of network reinforcement to a minimum.
- Reduced VAT on maintenance, repair and refurbishment could provide an economic stimulus and would give due weight to the value of embodied carbon in our built heritage. Maintenance and reuse of buildings is important to helping meet carbon emissions targets.
- The current VAT regime for heat pump installs is complex and a reduced rate of 5% VAT applied across the full invoice value of all heat pump installs would support reducing the upfront cost of heat pumps by around £1,000 per install.

Also with respect to taxation it was reported that in the commercial real estate sector much of the cost will attract capital allowances against Corporation Tax and it was suggested that it will be necessary to ensure that the arrangements and reliefs put in place are effective in the Scottish context.

It was also thought the new UK Emissions Trading Scheme could further unlock investment in decarbonised heat and energy efficiency projects.

Regulation of heating systems in buildings

There was support for calling on the UK Government to amend the Gas Act 1986 to stop extension of the gas grid to new properties which was agreed to be an important lever to accelerate the uptake of renewable heat systems and mitigate the need for future retrofitting of the new build housing stock. There was also a suggestion that there should be a ban on sale of gas boilers by 2035.

The whole energy system: gas network, electricity generation

The consultation paper explains that the Scottish Government is calling on the UK Government to accelerate decisions on the role of hydrogen and the future of the gas network, and to ensure relevant regulations are updated in a timely manner to support those decisions. It also wishes to update Ofgem's statutory obligations including in enabling the delivery of net zero.

Several respondents commented on the importance of decisions on decarbonising the gas network and the Scottish Government was urged to continue to push for accelerated decision making in this area. Decisions on investment in carbon capture and sequestering were also reported to be eagerly awaited since this will change the course of action towards the targets.

There was support for updating Ofgem's statutory obligations to include Ofgem enabling the delivery of net zero and interim targets. A forthcoming BEIS consultation was suggested to provide an opportunity to amend Ofgem's regulatory functions. However, a concern was also raised that for Ofgem to support the transition to net zero its current support for gas would need to end and that, if Ofgem is unable to make this change, a new regulator for heat and energy should be created.

Other points included the need for collaboration to:

- Ensure that Contracts for Difference support the renewable generating capacity planned within Scotland.
- Ensure that the infrastructure is in place for the widespread use of net zero heat in Scotland.
- Push for greater transparency on capacity from utility companies and explore a statutory duty to support the delivery of the decarbonisation of heat as detailed in the Strategy. Concerns were raised regarding the capacity of energy grids, and the need for certainty on what heat sources that will be available for projects that may take many years to complete.

Heat network customer protection

There was support for UK-wide heat network consumer protection and for having the option for Ofgem to regulate heat network providers. The benefits of a single consistent Heat Network Assurance Scheme were also suggested.

Hydrogen-ready boilers

Comments concerning hydrogen-ready boilers, included that development of a revised product standard requiring gas boilers to be hydrogen-ready should be accelerated as delays will mean that more gas boilers will be installed that are not future-proofed. However, there was also a view that making boilers hydrogen-ready could potentially lead to an unintended 'gas lock in' for customers before it is clear whether hydrogen for home heating will be a commercially viable alternative, and that hydrogen-ready boilers should only be deployed in line with confidence levels that gas mains in specific locations will be converted to hydrogen.

Bioenergy

The UK Government is being urged to work collaboratively to explore the role for different bioenergy fuels in buildings where alternatives are limited and, as appropriate, develop sustainability and other appropriate criteria for these forms of bioenergy. The acknowledgment of the role that bioenergy can play in the 'hard to treat' markets was welcomed, and the Scottish Government was encouraged to ensure that any energy source is sustainable. The Scottish Government was also urged to work with the UK Government with respect to criteria on import and taxation rates for HVO.

Schemes that operate across Great Britain (“GB wide schemes”)

There was agreement that the Scottish Government should work jointly with the UK Government to ensure that these schemes are compatible with Scotland’s heat transition trajectory.

Energy Company Obligation / Warm Homes Discount

The consultation paper explains that the UK Government is being urged to work with Scottish Ministers to bring ECO and the Warm Homes Discount levies together into a single Combined Levy to establish a single, flexible Scottish Fuel Poverty scheme, to support low-income households with higher energy costs, and help fund energy efficiency improvements and the switch to zero emissions heating.

The importance of aligning existing policies with ambitions to accelerate net zero delivery was acknowledged with respect to combining levies to establish a single Scottish Fuel Poverty scheme and it was argued ECO legislation and rules should be allowed to vary across the UK as long as they deliver common outcomes. However, it was also argued that potential benefits in linking support schemes more closely to national fuel poverty definitions and strategies will require co-operation between governments and that creating dual systems should not be considered a viable option.

It was also suggested that:

- To date, Scotland has benefited disproportionately from delivery under the GB-wide ECO scheme and exercise of legislative powers under the Scotland Act could result in worse outcomes for households in Scotland than continuing with the existing GB-wide delivery model.
- A separate Scottish scheme could result in added complexity and higher costs and could increase the risk that installers choose to deliver in only one area - either in England and Wales or just in Scotland.
- The proposal would mean that energy bills would be a source of public funding revenue, and it was argued that general taxation is a more progressive way to raise funding.
- The Warm Homes Discount is not a substitute for energy efficiency and lowering heat demand and should not be seen as a long-term solution to fuel poverty.

Some respondents urged the Scottish Government to work with the UK Government on development of a new ECO4 scheme which should be based on UK wide delivery. Other issues highlighted with respect to ECO funding included a suggestion that a requirement for PAS 2030/2035 accreditation for ECO funded programmes means access to this funding will be reduced and the viability of current programmes will be threatened. It was reported that difficulties in securing ECO funding are already being experienced in some island locations and it was argued new funding must be easier to access for all homes and also for small installers. As an alternative to current accreditation schemes, it was suggested a mechanism should be introduced for the work of businesses to be reviewed and audited.

Clean Heat Grant

There was support for working with the UK Government in relation to the CHG and for extension of the CHG to replace the RHI. It was agreed that the cost to install low/zero emissions heating in remote areas is much higher than other areas of the UK, so the flat funding level currently provided is far below the actual cost of supply and installation. Increasing the grant amount was proposed, including to allow the cost of a renewable energy system to be on par with the cost of a combustion appliance. It was also argued that the CHG should apply to technologies such as solar thermal and heat batteries to allow some flexibility to the building stock.

Further areas for joint action

General suggestions with respect to further joint action included areas in which further UK legislation might be necessary, for example on energy market competition rules, to enable mandatory connections to district heating, or on regulating for in-use performance.

Electricity pricing

In addition to the points on the relative levies on gas and electricity covered above, several respondents raised other issues in respect of electricity pricing including that:

- Higher prices for consumers in the north of Scotland need to be resolved.
- An island solution is required to enable wind power to be used locally. There was suggested to be an opportunity to make curtailed wind available to households at a significantly reduced rate.

It was argued that the Scottish Government should work with the UK Government to ensure that there are no structural barriers or disadvantages to fuel poor customers that stop them benefitting from new tariffs and technologies.

Household incomes and fuel poverty

There was a call for alignment in approaches between the UK and Scottish Governments in how to support those who are most at risk during the transition to net zero heating. The Scottish Government was also urged to:

- Continue to lobby for improvements to ensure incomes are maximised, for example by maintaining the current uplift for Universal Credit.
- Revisit the Scottish Fuel Poverty Review Panel's proposal for a minimum income standard as basis for universal welfare benefits, rather than treating fuel poverty as 'silo', as at present.

EPC methodology

It was suggested there should be work with the UK Government to reform the SAP methodology underlying the EPC system, but also that the Scottish Government should not be held back if a review in England and Wales is not progressing at the same speed as needed in Scotland.

Research and development

On the topic of innovation and new technology, it was suggested there should be knowledge sharing and collaboration between governments and wider collaborations with Higher Education and Research Institutes across the UK.

Sharing information/best practice

It was reported that the Construction Leadership Council is developing a National Retrofit Strategy, and co-ordination and collaboration to share best practice between the UK and Scottish governments was suggested.

More generally it was also argued that there should be sharing of information on lessons learned, for both current methods and new technologies.

Chapter 11: Monitoring, Evaluation and Future Decision Making

Monitoring and evaluation of delivery will allow the approach to be adapted where necessary. As well as looking at outputs, including policy and programme interventions, outcomes will be monitored and measure, to capture the impact of the transition to warmer, greener and more efficient homes and buildings has on Scotland's people, businesses and communities.

Alongside the finalised Heat in Buildings Strategy, the Scottish Government intends to will publish a monitoring and evaluation framework, setting out: a comprehensive framework for monitoring progress against the objectives set in the draft Strategy; and a range of output and outcome indicators to inform an annual statement of progress, taking account of the Climate Change Plan monitoring framework, as well as the monitoring and evaluation requirements for Fuel Poverty within the Fuel Poverty (Targets, Definition and Strategy) Act 2019.

Question 62 - Do you agree with our proposals for a monitoring and evaluation framework? If not, please state your reasons and suggested improvements.

Responses at Question 62 by respondent type are set out below.

Table 68

Question 62 - Do you agree with our proposals for a monitoring and evaluation framework?			
Respondent type	Yes	No	Total
Academic Group or Research Centre	0	1	1
Community Council, Trust or Group	0	2	2
Consultancy, Training, Assessment or Accreditation	6	1	7
Consumer Advice, Advocacy or Campaigning	4	0	4
Energy Generation, Supply or Distribution	4	0	4
Housing Association	6	1	7
Individual or Tenant Group	2	2	4
Local Authority	11	0	11
Product Manufacturer, Supplier or Installer	7	1	8
Professional or Representative Bodies (Energy)	3	0	3
Professional or Representative Bodies (Other)	7	0	7
Public Body	3	0	3
Third Sector or Non-Governmental Organisation	3	1	4
Total	56	9	65
Total %	86%	14%	

Of those respondents who answered the question, a large majority – 86% – agreed with the proposals for a monitoring and evaluation framework, while 14% disagreed.

The number of respondents providing a comment at Question 62 is set out below, with 55 respondents, or 31% of all respondents, commenting.

Table 69

Question 62: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	4%
Community Council, Trust or Group	6	2	4%
Consultancy, Training, Assessment or Accreditation	13	5	9%
Consumer Advice, Advocacy or Campaigning	8	3	5%
Energy Generation, Supply or Distribution	20	3	5%
Housing Association	9	5	9%
Individual or Tenant Group	15	3	5%
Local Authority	23	11	20%
Product Manufacturer, Supplier or Installer	19	5	9%
Professional or Representative Body (Energy)	15	3	5%
Professional or Representative Body (Other)	21	5	9%
Public Body	7	4	7%
Third Sector or Non-Governmental Organisation	14	4	7%
Total	178	55	100%
% of all respondents commenting		31%	

Some respondents, including Local Authority respondents, simply noted their approval or welcomed the proposals. Others, from a range of respondent types, suggested further details are needed or stated an expectation that there will be specific consultation on the monitoring and evaluation framework.

The importance of providing confidence for both the public and the industry was noted. There was specific support for:

- An annual statement of progress.
- The commitment to review the Strategy in mid 2020s.

On the latter point, it was also argued that there should be some limit on the extent to which policy can be changed in 2025, since too many changes could risk putting

the entire strategy back further, and that any major changes should be well signalled and evidenced to all market participants.

The intention to measure outcomes as well as outputs using a range of indicators was welcomed and was a more frequently raised issue, including by Housing Association respondents. It was argued that this should include fuel poverty statistics, measures to reflect the health of the nation, and impacts on property markets. Integration with the Climate Change Plan Monitoring Framework was also suggested.

However, there was a concern that the outcomes listed in Chapter 2 of the consultation paper are not 'SMART'¹⁸ and will be difficult to measure, and several quantifiable indicators were suggested. The need for monitoring to be *in situ* or to reflect real world performance was emphasised and it was argued that, unless anticipated running and maintenance costs are met, buy-in will soon drop off. A Housing Association respondent reported their own experience that heating types they had installed had failed to deliver in-home performance and/or were costly to maintain and challenging to use. Suggestions included that:

- User experience of new technologies should be included in monitoring or that randomised field trials could ensure learning from actual consumer experience rather than controlled demonstrations.
- New measurement techniques have made building performance measurement practical at scale.
- Internet of Things technologies could be useful in gathering empirical data, including actual energy use and environmental conditions.

Tools such as Digital Twins were suggested to be key to making the monitoring and evaluation framework effective and the need to develop a digital platform that can provide a complete audit trail from initial inspection, to design and installation and completion was suggested to be essential to follow retrofit progress and to identify successes and failure within the programme.

The role of EPC certificates in recording progress was also noted, although it was suggested thought should be given to how EPCs are kept up-to-date, and that reducing the validity period to three years, or when a material change is made to the building, should be considered.

General points on the characteristics of monitoring included that monitoring should: be robust, independent, thorough and long-term; have a method for assessing all properties regularly; include cost per tonne of carbon saved, and the ratio between public and private sector funding; and should disaggregate indicators by local authority.

Suggested additions to the current proposals included:

- Inclusion of short and medium-term milestones to ensure progress is keeping pace with an 'emergency response' imperative. However, it was also argued

¹⁸ Specific, Measurable, Attainable, Relevant and Time Based.

there is a risk of becoming overly process-driven and it is equally important to ensure the benefits are realised and not simply that milestones are met.

- Inclusion of indicators for the development of sector specific skills and retrofit of traditional buildings.
- Developing a Theory of Change as part of the monitoring framework.
- Including a clear learning plan, that would go beyond monitoring and evaluation to review and update processes as the Strategy is implemented.

The need for greater transparency was also suggested and that evaluation of past experience should be included to avoid repeating previous failures. Review of past programmes was thought valuable, not only from the perspective of the lessons learned at the time, but also as an opportunity to check on longer-term consequences which may not have been possible to detect at the time of the programme itself.

Other points on monitoring and evaluation included that:

- There should be clarity about Ministerial responsibilities for delivery of the programme, and about the roles and make up of advisory bodies which will be required.
- Governance should involve an Industry Board, separate from local government that should include representation from Scottish Government, Local Government and Industry.
- A strategic overview body could be set up to monitor and evaluate progress across Scotland.
- The monitoring and evaluation framework needs to align with Ofgem's monitoring of network investment plans to work with the sector. Also with respect to Ofgem it was suggested that, in light of the regulator being tasked to help deliver Net Zero, opportunity under the Scotland Act for the Scottish Government to receive and examine Ofgem's plans on an annual basis should be used to ensure sufficient effort is being applied.

Question 63 - What are your views on how lessons learned from heat and energy efficiency policy and programmes should be shared with the sector and key stakeholders to ensure that Scotland benefits from the public investment outlined above?

The number of respondents answering Question 63 is set out below, with 54 respondents, or 30% of all respondents, answering.

Table 70

Question 63: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	0	0%
Consultancy, Training, Assessment or Accreditation	13	4	7%
Consumer Advice, Advocacy or Campaigning	8	4	7%
Energy Generation, Supply or Distribution	20	3	6%
Housing Association	9	5	9%
Individual or Tenant Group	15	5	9%
Local Authority	23	13	24%
Product Manufacturer, Supplier or Installer	19	3	6%
Professional or Representative Body (Energy)	15	2	4%
Professional or Representative Body (Other)	21	8	15%
Public Body	7	4	7%
Third Sector or Non-Governmental Organisation	14	3	6%
Total	178	54	100%
% of all respondents commenting		30%	

Sharing lessons learned was considered to be important with suggestions there should be independent audits, regular reporting, and that the results should be freely available. It was suggested that, at present, sharing of information on programmes is not good and that better information flows and more effective promulgation of results should be required as a condition of grant.

Share *all* experience and learn quickly

The point made most frequently at Question 63 was that, in addition to sharing success stories, it will be important to share experience of things that have not gone well if lessons are to be learned. Housing Association, Local Authority and Product manufacturer respondents were amongst those raising this issue. It was argued this analysis should be open, honest, and non-judgemental and that, at present, too many projects are presented much more positively than the actual lived experience. It was also suggested that sharing experiences with communities via trusted local intermediaries will be helpful, particularly if this includes explanation of things that have not worked and what has been changed to remedy these problems.

The importance that learning is assimilated as quickly as possible was also highlighted. As an illustration of the point, it was noted that there were examples

from LHEES pilots where reports were not ready in time to guide the following year's programme, meaning lessons could not be learned and acted upon. Development of a digital framework for reporting data across the housing sector was suggested as facilitating early identification of problems and corrective action, and of notifying co-ordinators, designers and assessors.

Dealing transparently with issues and showing that a sensible and proportionate response has been actioned was argued to be a key element for customer and supply chain buy in.

A central data source

Several respondents commented on the value of a central resource, for sharing learning experience between stakeholders. It was suggested this might be a website or database that allows sharing of best practice, cases studies, discussions of lessons learnt or current challenges, and access to technical experts. It could also help local delivery agents and advice services to share practical examples with their communities to support engagement and encourage participation in programmes. Suggestions included a dedicated website similar to that set up for the Each Home Counts Review and a Knowledge Hub.

Other channels for sharing information

It was suggested to be important to continue to engage with the sector and other stakeholders and there were specific references to SMEs, the supply chain and property industry, developers, landlords, anchor organisations and consumers. Strategy delivery groups and regional groups were also mentioned.

Specific organisations or networks referenced as routes for sharing information included COSLA, the Scottish Federation of Housing Associations, Scottish Energy Officers Network (SEON), the Sustainable Scotland Network, the Convention of the Highlands and Islands, and the Scottish Cities Alliance.

Among the methods suggested for sharing information were:

- Progress reports and case studies. Where possible, keeping case studies local and relevant was suggested.
- Events including meetings, seminars, workshops, working groups and forums, webinars, use of social media, newsletters and TV updates.

Question 64 - Finally, is there any other information you would like to provide us with that is relevant to the development of Scotland's Heat in Building Strategy?

The number of respondents answering Question 64 is set out below, with 33 respondents, or 19% of all respondents, answering.

Table 71

Question 64: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	1	3%
Community Council, Trust or Group	6	1	3%
Consultancy, Training, Assessment or Accreditation	13	3	9%
Consumer Advice, Advocacy or Campaigning	8	0	0%
Energy Generation, Supply or Distribution	20	2	6%
Housing Association	9	4	12%
Individual or Tenant Group	15	3	9%
Local Authority	23	6	18%
Product Manufacturer, Supplier or Installer	19	3	9%
Professional or Representative Body (Energy)	15	4	12%
Professional or Representative Body (Other)	21	5	15%
Public Body	7	1	3%
Third Sector or Non-Governmental Organisation	14	0	0%
Total	178	33	100%
% of all respondents commenting		19%	

Some respondents took the opportunity to provide references that, along with citations at other questions, have been collated and passed to the Scottish Government

Other answers at Question 64 (where not already covered elsewhere in the report) are addressed in the analysis at Question 69.

Chapter 12: Environmental Report

A Strategic Environmental Assessment has been undertaken to identify where the policies and proposals set out in this draft Strategy may have significant – positive or negative - environmental effects.

Around 10 respondents answered each of the questions on the Environmental Report, several respondents answering all four questions.

Question 65 - What are your views on the accuracy and scope of the information used to describe the SEA environmental baseline set out in the Environmental Report?

The number of respondents answering Question 65 is set out below, with 12 respondents, or 7% of all respondents, answering.

Table 72

Question 65: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	8%
Consultancy, Training, Assessment or Accreditation	13	0	0%
Consumer Advice, Advocacy or Campaigning	8	2	17%
Energy Generation, Supply or Distribution	20	0	0%
Housing Association	9	2	17%
Individual or Tenant Group	15	0	0%
Local Authority	23	4	33%
Product Manufacturer, Supplier or Installer	19	0	0%
Professional or Representative Body (Energy)	15	1	8%
Professional or Representative Body (Other)	21	0	0%
Public Body	7	1	8%
Third Sector or Non-Governmental Organisation	14	1	8%
Total	178	12	100%
% of all respondents commenting		7%	

The environmental baseline section of the report sets out information on: Climatic Factors; Population and human health; Air; Material Assets (Energy, development and infrastructure, Land Use); Landscape; Cultural and historic heritage; and the likely evolution of the environment without implementation of the draft Strategy.

The accuracy and scope of the information set out was suggested to be reasonable and appropriate, or to be considered and proportionate to the environmental baseline. The scope was variously described as covering the basic requirements, as being quite far-reaching and as covering a broad range of topics. The report was suggested to accurately set out the scale of the environmental problems for each of the scoped in environmental factors and the current state of the environment.

However, the scope of the information set out was also suggested to be incomplete when compared with the draft Strategy and to overlook the content of the Hydrogen Policy Statement of December 2020.

It was suggested the SEA should:

- Be updated with results of the 2021 census.
- Be revised to consider the use of low carbon hydrogen either as blend or as 100% hydrogen for decarbonising heat for buildings.
- Recognise the undesignated historic environment as having value in its own right, not just through its role in providing context for designated assets.
- Provide more specific consideration of the residential sector, although it was acknowledged overlap between residential and other sectors could lead to 'double counting'.

Question 66 - What are your views on the reasonable alternatives set out in the Environmental Report?

Moving on to the subject of reasonable alternatives, the report notes that the Environmental Assessment (Scotland) Act (2005) Act requires identification, description and evaluation of the likely significant effects of reasonable alternatives to the draft Strategy. In this case, doing nothing is not a reasonable alternative because a new target is now required in order to comply with S61 of the Climate Change (Scotland) Act 2009. In terms of consideration of alternative energy efficiency and heat technology scenarios as a means to deliver a proposed target, it is considered that there are no reasonable alternatives to a mixed or blended technology pathway as the most effective and credible means of achieving our statutory emission reduction targets in the heat in buildings sector.

The number of respondents answering Question 66 is set out below, with 9 respondents, or 5% of all respondents, answering.

Table 73

Question 66: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	11%
Consultancy, Training, Assessment or Accreditation	13	0	0%
Consumer Advice, Advocacy or Campaigning	8	1	11%
Energy Generation, Supply or Distribution	20	0	0%
Housing Association	9	2	22%
Individual or Tenant Group	15	0	0%
Local Authority	23	3	33%
Product Manufacturer, Supplier or Installer	19	0	0%
Professional or Representative Body (Energy)	15	1	11%
Professional or Representative Body (Other)	21	0	0%
Public Body	7	0	0%
Third Sector or Non-Governmental Organisation	14	1	11%
Total	178	9	100%
% of all respondents commenting		5%	

There was broad agreement that doing nothing is not a reasonable alternative, and it was also agreed that there is no reasonable alternative to a mixed or blended technology pathway. The need for greater emphasis on the potential role of hydrogen as part of this mix was suggested.

Question 67 - What are your views on the predicted environmental effects as set out in the Environmental Report?

In Section 6, the Environmental Report records the likely significant environmental effects of key proposals assessment. It concludes that, when taken together with existing plans, programmes and strategies, the proposed framework can contribute to significant positive effects for climatic factors, population and human health, air and material assets. In particular, it is considered likely that a focus on strategically important energy efficiency measures and heat technologies ready for deployment will broadly and cumulatively contribute to significant positive effects for climatic factors, air, population and human health and material assets in the short term.

The number of respondents answering Question 67 is set out below, with 10 respondents, or 6% of all respondents, answering.

Table 74

Question 67: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	10%
Consultancy, Training, Assessment or Accreditation	13	0	0%
Consumer Advice, Advocacy or Campaigning	8	2	20%
Energy Generation, Supply or Distribution	20	0	0%
Housing Association	9	2	20%
Individual or Tenant Group	15	0	0%
Local Authority	23	3	30%
Product Manufacturer, Supplier or Installer	19	1	10%
Professional or Representative Body (Energy)	15	0	0%
Professional or Representative Body (Other)	21	0	0%
Public Body	7	0	0%
Third Sector or Non-Governmental Organisation	14	1	10%
Total	178	10	100%
% of all respondents commenting		6%	

There was agreement with the findings, and that the strategy will result in positive outcomes for the factors assessed. Limitations and uncertainties were thought to be reasonable or to have been appropriately identified.

Suggested additions included that:

- The section on key issues for material assets should include impacts on historic buildings of wetter weather, prolonged dry spells and severely fluctuating temperatures. The effects of previous non-appropriate interventions to traditional buildings should also be noted.
- Key issues for the historic environment are the potential for direct and indirect impacts associated with the development and deployment of technologies and new infrastructure associated with heat decarbonisation.

The report notes that localised negative effects on population and human health could also arise such as, through noise linked to the operation of heat pumps. While it was acknowledged that noise can be an issue in some cases, it was argued that product development has limited the noise associated with heat pumps to less than 42 decibels.

Question 68 - What are your views on the findings of the SEA and the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report?

Sections 7 and 8 of the Environmental Report cover proposals for mitigation of effects, and for monitoring of significant environmental effects to enable appropriate remedial action, where applicable.

The number of respondents answering Question 68 is set out below, with 11 respondents, or 6% of all respondents, answering.

Table 75

Question 68: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	0	0%
Community Council, Trust or Group	6	1	9%
Consultancy, Training, Assessment or Accreditation	13	0	0%
Consumer Advice, Advocacy or Campaigning	8	2	18%
Energy Generation, Supply or Distribution	20	0	0%
Housing Association	9	2	18%
Individual or Tenant Group	15	0	0%
Local Authority	23	4	36%
Product Manufacturer, Supplier or Installer	19	0	0%
Professional or Representative Body (Energy)	15	1	9%
Professional or Representative Body (Other)	21	0	0%
Public Body	7	1	9%
Third Sector or Non-Governmental Organisation	14	0	0%
Total	178	11	100%
% of all respondents commenting		6%	

There was support for proposals for mitigation and monitoring as outlined in the report.

Mitigation

Mitigation was considered an important element of the Strategy, and was suggested to be particularly relevant for new technologies where the impacts are unknown. It was argued funding should be made available for adequate research, data collection and analysis, and testing to give new technologies the best chance of success and to mitigate potential impacts.

Local mitigation measures

It was agreed that mitigation against negative environmental effects should be incorporated into local strategy as not all locations will experience secondary mixed/uncertain effects in the same way, and mitigation could offer a more detailed analysis of the environmental effects that are set out for this level.

Strategic mitigation

Strategic mitigation was also thought important since scaling up technologies could have the potential for mixed/uncertain environmental impacts.

Monitoring

There was agreement that monitoring in-line with other existing programmes should form an integral part of the framework, and that this should focus on monitoring the impacts on people and communities of the transition to warmer, greener and more affordable homes and buildings.

Enhancement

The SEA also highlights opportunities for enhancement and these were thought important to gain the maximum environmental impacts through this strategy, for example through supporting opportunities for the deployment of zero emissions technologies in deprived areas or rural areas and linking in with the Government's policies to achieve the best outcomes.

The proposal to engage with Historic Environment Scotland to maximise environmental benefits while respecting and preserving the special characteristics of our buildings and places was also welcomed.

Chapter 13: General questions

Question 69 - Is there any further information you wish to provide on the content set out in this draft Strategy?

The number of respondents answering Question 69 is set out below, with 40 respondents, or 22% of all respondents, answering.

Table 76

Question 69: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	5%
Community Council, Trust or Group	6	3	8%
Consultancy, Training, Assessment or Accreditation	13	2	5%
Consumer Advice, Advocacy or Campaigning	8	1	3%
Energy Generation, Supply or Distribution	20	1	3%
Housing Association	9	4	10%
Individual or Tenant Group	15	6	15%
Local Authority	23	5	13%
Product Manufacturer, Supplier or Installer	19	3	8%
Professional or Representative Body (Energy)	15	4	10%
Professional or Representative Body (Other)	21	6	15%
Public Body	7	0	0%
Third Sector or Non-Governmental Organisation	14	3	8%
Total	178	40	100%
% of all respondents commenting		22%	

In addition to the SEA, a partial Business and Regulatory Impact Assessment (BRIA) was published with the consultation paper. While acknowledging that work on the BRIA is at an early stage, a number of points on its content were made, including that it needs to be more analytical about the potential for job losses arising from the draft Strategy, particularly with reference to fuel distribution companies as well as boiler servicing and maintenance and refinery activities.

A potential impact of the Strategy on town centres was also highlighted where, if the investment to achieve the required levels of energy efficiency in existing buildings cannot be justified, the owner may leave a building vacant. It was reported that very few speculative projects are capable of being financed in the current market and that any additional cost burden will have a negative impact on the potential for development activity.

Other comments on the draft Strategy included that:

- It does not reference the first energy strategy - 'The Future of Energy in Scotland' - and is unclear whether a whole energy system approach is still endorsed by the Scottish Government.
- The recent consultation 'Evidencing how Pre-1919 Dwellings can support Net Zero in Scotland' could be referenced in the Strategy.
- Neither air-to-air heat pumps nor networked heat pumps are covered. The Expert Advisory Group was also suggested to lack expertise on Ambient Heat networks.
- Cybersecurity is not mentioned, and is important given the increasing reliance on the internet for control at all levels of the energy system, and since energy utilities are one of the areas that have been targeted in cyberattacks.
- There is no reference to fire safety in relation to cladding of buildings or as a result of misuse of electrical equipment. An increase in the number of electrical appliances combined with a shortage of trained installers and a lack of familiarity with electrical heating was suggested likely to impact electrical safety.
- Organisations that own non-domestic buildings will need to understand how the legislation will impact them. A mini model or methodology for such organisations was suggested that could help focus attention on where projects are needed, then suggest projects, giving indicative costs and savings.
- Opportunities from working at scale in an area were suggested, whereby local homeowners could 'buy-in' to a large scheme – for example a social housing refurbishment project where contractors are installing a large number of similar energy efficiency measures as part of one large scheme.
- Expediting the Tenement Condition Workplan published in March 2021 could increase the ease with which works can be actioned and aid the ambition to reach net zero.

Question 70 - Is there anything else you would like to highlight about the role, opportunities for, and constraints of, specific types of organisation (such as local government, other public sector, trade associations, individual business organisations, charities, environmental organisations, community groups) in contributing to the transition to zero emissions buildings, in particular over the next five to ten years?

The number of respondents answering Question 70 is set out below, with 46 respondents, or 26% of all respondents, answering.

Table 77

Question 70: Number of comments by respondent type			
Respondent type	Total respondents by type	Number of respondents commenting	% of all comments made by type of respondent
Academic Group or Research Centre	8	2	4%
Community Council, Trust or Group	6	2	4%
Consultancy, Training, Assessment or Accreditation	13	4	9%
Consumer Advice, Advocacy or Campaigning	8	3	7%
Energy Generation, Supply or Distribution	20	2	4%
Housing Association	9	6	13%
Individual or Tenant Group	15	5	11%
Local Authority	23	7	15%
Product Manufacturer, Supplier or Installer	19	3	7%
Professional or Representative Body (Energy)	15	2	4%
Professional or Representative Body (Other)	21	7	15%
Public Body	7	1	2%
Third Sector or Non-Governmental Organisation	14	2	4%
Total	178	46	100%
% of all respondents commenting		26%	

The roles of many of the organisations listed in the question have been discussed throughout the consultation, but particularly at Questions 10, and 23 and points made elsewhere are not repeated.

General points included the need for more detailed engagement with the building retrofit industry, including with heat network developers to understand the challenges around meeting heat decarbonisation and achieving standards such as PAS 2035.

Opportunities for various sectors or types of organisation to contribute to the Strategy or the transition were also suggested including:

- Climate Action Towns and Community Climate Action Hubs, in supporting and disseminating messaging and providing advice and technical support for local people.
- Social Housing acting as a test-bed for new technologies and targets and as a source of expertise, with the Highlands and Islands Housing Association's Affordable Warmth Group highlighted in this respect.
- The Zero Emissions Social Housing Taskforce as a source of recommendations which will feed into the final strategy.

- The potential of Tighean Innse Gall as a community benefit society model, including as a means of building local capacity.
- Engineering consultants, who will design most buildings of any scale and who may already be involved in developing decarbonisation strategies.
- Chartered architects (such as The Royal Incorporation of Architects in Scotland and its members) who have an overview of technical and regulatory issues across the sector.
- Third sector organisations, such as the Energy Saving Trust, Changeworks, and Scarf who can help shape future funding schemes for alleviating fuel poverty.
- A body such as the Energy Savings Trust could act as host for a not-for-profit smarter comparison tool and could also oversee a system of verified independent assessments of the performance of installations.

In terms of constraints for organisations, points raised included that:

- The NHS needs high grade heat that currently precludes many low/zero emissions heat technologies.
- Social landlords are under pressure in many respects (e.g. fire safety standards) as well as EESSH2 requirements and the Government should recognise this.
- In the voluntary sector, volunteer time is a limiting factor and turnover of personnel over a period of time requires effort to build continuity.

Annex 1: Organisational respondents

Academic Group or Research Centre (n=8)
Active Building Centre
Centre for Energy Policy, University of Strathclyde
Centre for Research into Energy Demand Solutions (CREDS)
ESALA Sustainable Built Environment Group, Edinburgh School of Architecture and Landscape Architecture, University of Edinburgh
European Marine Energy Centre Ltd (EMEC)
Imperial College London
University of Edinburgh
University of Edinburgh
Community Council, Trust or Group (n=6)
Barra and Vatersay Community Ltd.
Iona Renewables
Isle of Luing Community Trust
Linlithgow and Linlithgow Bridge Community Council
Sustainable Cupar
Zero Carbon Daviot (SCIO status applied for with OSCR)
Consultancy, Training, Assessment or Accreditation (n=13)
Catapult Energy Systems
CBRE Ltd.
Elmhurst Energy
Fair Heat
Gemserv
Integrated Environmental Solutions Ltd (IES)
MCS Charitable Foundation and MCS (Service Company) LTD
MPA - The Concrete Centre
Quidos
RECC
TownRock Energy
Troup Bywaters + Anders
TrustMark (2005) Limited
Consumer Advice, Advocacy or Campaigning (n=8)
Architects Climate Action Network (ACAN) Scotland
Changeworks
Citizens Advice Scotland

Energy Saving Trust
The Institution of Civil Engineers Scotland Public Voice Committee
Tighean Innse Gall
United Kingdom Without Incineration Network (UKWIN)
Warmworks Scotland
Energy Generation, Supply and Distribution (n=20)
Aberdeen Heat and Power
AMP Clean Energy
Calor Gas
E.ON UK
EDF Energy
Energy UK
Engie UK Ltd
Knoydart Renewables Limited
Last Mile Infrastructure Group
National Grid
NeoTerra Energy
Oil Firing Technical Association Ltd
OVO
Power Circle
Scottish Power
SGN
Shetland Heat Energy and Power Ltd
SPEN
SSE Enterprise
SSEN
Housing Association (n=9)
Cairn Housing Association
Glasgow and West of Scotland Forum of Housing Associations
Hebridean Housing Partnership
Link Group
Lochalsh & Skye Housing Association
Places for People
Sanctuary Group
Scottish Federation of Housing Associations
Wheatley Group

Individual or Tenant Group (name to be published only) (n=6)
Peter Strang Steel
Rod Frazer
Scottish Government Regional Network
Stirling Tenants Assembly
Susan Krumdieck
Zoe Shipton (Professor) and Gareth Johnson (Dr)
Local Authority (n=23)
Aberdeen City Council
Aberdeenshire Council
ALACHO
Argyll and Bute Council
City of Edinburgh Council
Comhairle Nan Eilean Siar
COSLA
Dumfries and Galloway Council
East Dunbartonshire Council
East Lothian Council
Falkirk Council
Fife Council
Glasgow City Council
Heads of Planning Scotland (HOPS)
Inverclyde Council
North Lanarkshire Council
Orkney Islands Council
Perth & Kinross Council
Scottish Borders Council
Shetland Islands Council
South Lanarkshire Council
West Dunbartonshire Council
West Lothian Council
Product Manufacturer, Supplier or Installer (n=19)
Balcas Timber Limited
Baxi Heating
BEAMA Ltd

Bennamann Limited
Build Test Solutions
City Plumbing Holdings
Connected Response Ltd
Ground Source Heat Pumps Ltd
Groupe Atlantic UK
Heatsave Shetland Ltd
Kingspan Insulation Ltd.
NIBE Energy Systems UK
Richmonds Plumbing & Heating Merchants Ltd
Star Renewable Energy
Sunamp Ltd
Sutherland Tables
The Kensa Group
Vaillant Group UK LTD
Worcester BOSCH
Professional or Representative Bodies (Energy) (n=15)
Association for Decentralised Energy
Energy and Utilities Alliance (EUA)
Heat Pump Association
Heat Vision 2030
Independent Networks Association (INA)
Institution of Gas Engineers & Managers
Liquid Gas UK
Mineral Wool Insulation Manufacturers Association (MIMA)
National Insulation Association (NIA)
Orkney Renewable Energy Forum
Scottish Hydrogen And Fuel Cell Association
Scottish Renewables
Sustainable Energy Association
The Association for Renewable Energy & Clean Technology (REA)
United Kingdom and Ireland Fuel Distributors Association
Professional or Representative Bodies (Other) (n=21)
Association of Consultancy & Engineering Scotland

BEFS (Built Environment Forum Scotland)
Building Alliance
Central Association of Agricultural Valuers (CAAV) & Scottish Agricultural Arbiters and Valuers Association (SAAVA)
Chartered Institute of Architectural Technologists
Chartered Institute of Housing Scotland
CIBSE (Chartered Institution of Building Services Engineers)
Federation of Master Builders
Federation of Small Businesses
Law Society of Scotland
Royal Institution of Chartered Surveyors (RICS)
Royal Town Planning Institute
Rural and Islands Housing Association Forum
Scottish Care
Scottish Land and Estates
Scottish Property Federation
Scottish Wholesale Association
Snipef Management Ltd
The Architectural Heritage Society of Scotland (AHSS)
The Royal Incorporation of Architects in Scotland (RIAS)
UK Finance
Public Body (n=7)
Highlands and Islands Enterprise
Historic Environment Scotland
NHS Scotland Energy Forum
Ombudsman Services
Scottish Enterprise
Scottish Futures Trust
South of Scotland Enterprise
Third Sector or Non-Governmental Organisation (n=14)
Age Scotland
Community Energy Scotland
Energy Action Scotland
Existing Homes Alliance Scotland
Friends of the Earth Scotland
Greenspace Scotland

Historic Houses
Institute of Historic Buildings Conservation (Scotland Branch)
Keep Scotland Beautiful
Scotland and Northern Ireland Electrical Safety First
The National Trust for Scotland
Tweeddale Energy Efficiency Supply Chain Development Project c/o Southern Upland Partnership (SUP)
WWF Scotland
Zero Waste Scotland

Annex 2: Abbreviations used

AHSP	Affordable Housing Supply Programme
BEIS	Department for Business, Energy and Industrial Strategy
CAO	Community Anchor Organisation
CARES	Community and Renewable Energy Scheme
CCS	Carbon Capture and Storage
CHG	Clean Heat Grant
CHP	Combined Heat and Power
CTSI	Chartered Trading Standards Institute
DNO	Distribution Network Operator
ECO	Energy Company Obligation
EfW	Energy from Waste
EPC	Energy Performance Certificate
EESHS	Energy Efficiency Standard for Social Housing
EESHS2	Energy Efficiency Standard for Social Housing post 2020
EU	European Union
FE	Further Education
HEEPS	Home Energy Efficiency Programmes for Scotland
HVO	Hydrotreated Vegetable Oil
LBTT	Land and Buildings Transaction Tax
LCITP	Low Carbon Infrastructure Transition Programme
LDP	Local Development Plan
LHEES	Local Heat and Energy Efficiency Strategies
LHS	Local Housing Strategy
LPG	Liquefied Petroleum Gas
LPP	Local Place Plan
NPF4	Fourth National Planning Framework
PACE	Property Assessed Clean Energy
PAS	Publicly available specification
PDR	Permitted Development Rights
PRS	Private Rented Sector
PV	Photovoltaics
RSL	Registered Social Landlord
RSS	Regional Spatial Strategy
SAP	Standard Assessment Procedure
SDS	Skills Development Scotland
SME	Small and Medium Enterprise
SHNZHF	Social Housing Net Zero Heat Fund